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Climate Change and Water

Final Prospectus Report

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This report was prepared by the International Development Research Centre's Climate Change and Water program (2010-2015) as part of the program's external evaluation. This document has been modified from the original version (links to internal documents have been removed).

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List of acronyms

ACCFP – Africa Climate Change Fellowship Program
ALF – Annual Learning Forum
ATREE – Ashoka Trust for Research in Ecology and the Environment
ARCA – Alexandria Research Centre for Adaptation
ARC3-2 – Third Assessment Report on Cities and Climate Change
AS – *Agua Sustentable*
A&E – Agriculture and Environment
CATHALAC – *Centro del Agua del Trópico Húmedo para America Latina y el Caribe* (Water Centre for the Humid Tropics of Latin America and the Caribbean)
CCAA – Climate Change Adaptation in Africa program
CCAP – Chinese Center for Agricultural Policy
CCW – Climate Change and Water program
CDA – Chilika Development Authority
CoCoon – Conflict and Cooperation over Natural Resources in Developing Countries program
COP 19 – 19th Convention of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC)
CSAG-UCT – Climate System Analysis Group at the University of Cape Town
DANIDA – Danish International Development Agency
DFATD – Department of Foreign Affairs, Trade, and Development (Canada)
DfID – Department for International Development (UK)
DRR – Disaster Risk Reduction
FANRPAN – Food, Agriculture, and Natural Resources Policy Analysis Network
GIS – Geographic Information System
GOC – Government of Canada
IAI – Inter-American Institute for Global Change Research
ICLEI – Local Governments for Sustainability
ICTs – Information and Communication Technologies
ICTWCC – Information and Communication Technologies for Water and Climate Change
IDRC – International Development Research Centre
IGP – *Instituto Geofísico del Perú*
IIED – International Institute for Environment and Development
IPCC – Intergovernmental Panel on Climate Change
ISET-Nepal – Institute for Social and Environmental Transition in Nepal
ISET-Pakistan – Institute for Social and Environmental Transition in Pakistan
IWMI – International Water Management Institute
LAC – Latin America and Caribbean
LACEEP – Latin American and Caribbean Environmental Economics Program
LEAP – Long-range Energy Alternatives Planning System
MOU – Memorandum of Understanding
MP – Member of Parliament
MSc – Master of Science
NISTPASS – National Institute for Science and Technology Policy and Strategy Studies
NGOs – Non-Governmental Organizations
NDF – Nordic Development Fund
NRCan – Natural Resources Canada

OA1 – Outcome Area 1
OA2 – Outcome Area 2
OA3 – Outcome Area 3
OXFAM – Oxford Committee for Famine Relief
PCRs – Project Completion Reports
PMRs – Project Monitoring Reports
PO – Project Officer
RPE – Rural Poverty and Environment program
SaciWATERs – South Asia Consortium for Interdisciplinary Water Resources Studies
SEI – Stockholm Environment Institute
SLR – sea level rise
SPDC – Social Policy and Development Centre
TTI – Think Tank Initiative
TRs – Trip Reports
UN – United Nations
UCCRN – Urban Climate Change Research Network
UCT – University of Cape Town
UNAM – *Universidad Nacional Autónoma de México* (National Autonomous University of Mexico)
UPE – Urban Poverty and Environment program
UWI – University of West Indies
WAS – Women's Safety Audit
WEAP – Water Evaluation and Planning System
WHO – World Health Organization
WI – Wetlands International

Executive summary

Climate change is a pressing threat to sustainable development, affecting water availability, food security, and livelihoods for millions of vulnerable people around the world. IDRC's Climate Change and Water (CCW) program (2010-2015) set out to help the world's most vulnerable people adapt to the water-related impacts of climate change by supporting research that improves both adaptation policy and practice. At the time that this report was submitted, the program's portfolio included 121 projects (research projects, research support projects, and awards projects) across Africa, Asia, and Latin America and the Caribbean, for a combined value of $75.3 million.

Recognizing that climate change adaptation is a new concept, the program focused on three outcome areas: knowledge generation, capacity building and leadership, and informing climate change policy.

Knowledge generation

The CCW program helped to support original research in three key areas: vulnerability and risk analysis, identifying and testing adaptation options, and shedding light on what adaptive capacity means. Programming was clustered into different categories to facilitate networking across projects. For instance, there is a cluster of work on climate change impacts in mountain ecosystems (Andes and the Himalayas), small-island states, as well as in cities and city-regions. Over 90 peer-reviewed papers have been published to date from CCW projects, representing an important contribution to the state of science on adaptation.

Research projects supported by CCW have helped to inform both planned and autonomous (i.e. measures practiced by people in response to threats) adaptation strategies at the local level, by testing solutions that improve water availability and minimize risk from the water-related impacts of climate change. Many grantees categorized adaptation as either "hard" infrastructure-oriented options (e.g. a sea walls or drainage systems) or "soft" options (e.g. improved governance or stakeholder engagement). A compendium of over 100 adaptation options identified and tested through CCW-funded research is due for completion in 2015, with the goal of facilitating their use by practitioners. These options have the potential to help hundreds of thousands of people.

Capacity building and leadership

The overall approach to capacity building involved empowering high-performing grantees to innovate in their use of methods for adaptation research (leading to more than 10 researchers and/or project teams receiving prestigious awards and recognition), brokering South-South opportunities for shared learning, and equipping lower-capacity researchers to select appropriate methods for generating relevant findings. The program also provided 126 emerging researchers with fellowships and awards opportunities.

By encouraging grantees to work across disciplines, CCW-funded research has ensured that adaptation solutions better meet the needs of different end-users and consider the complexity of a range of socio-economic contexts. The program made a notable impact in this area, and even informed the restructuring of several institutions to encourage more collaboration between social and natural scientists. Specific areas of focus for capacity building included: economic analysis (to improve understanding of the costs of climate change impacts and potential avoided costs from different adaptation measures), climate and hydrological modelling (to better project future scenarios for specific locations), and vulnerability assessments (for identifying populations that are most at risk).

CCW organized seven synthesis meetings bringing together clusters of projects around specific methods, geographic regions, or themes, with the goal of facilitating networking and learning across the program portfolio (see Annex 7). Close to 1000 researchers have benefitted from the sustained support of the CCW program over the course of the program.

Informing policy

The CCW program applied a number of strategies to encourage the use of research in decision making. By far, the most common role that CCW researchers played in influencing policy has been through consultation by direct request from government. In numerous cases, partners have been invited to lead or champion policy change with relevant government ministries. Some governments have also referred to the experience of CCW grantees in order to scale up studied technologies (e.g. in Burkina Faso and Tanzania). Furthermore, 24 CCW grantees are authors of the IPCC's Fifth Assessment Report. In the final two years of the program, formal relationships were established with key organizations, on the basis of benefit for our grantees and in terms of strategic value for IDRC in making a contribution to global policy debates. Key partnerships included those with Environment Canada, ICLEI-Global, the International Water Resources Association, and the Urban Climate Change Research Network.

A major influence on the program was the decision by the Government of Canada to contribute $1.2 billion in additional funding under the "Fast Start Climate Finance" banner, announced in 2010 as part of Canada's commitment under the Copenhagen Accord. Split over two rounds, CCW secured $30 million in Fast Start financing, which led to 19 additional projects with high performing research partners. This opportunity contributed to IDRC playing a more active role in supporting the Government of Canada's policy goals. The program also found that projects offering tangible and practical products to policymakers tended to be more successful in informing policy, hence the focus on early engagement to better understand the needs of decision-makers. In particular, "no-regrets" options (investments that are adaptive while also meeting short-term needs) tended to attract the most interest.

Future directions: Building on IDRC's investments in adaptation

In the final year of the CCW program, it was clear that two areas of work held the most promise in terms of having future impact: (1) adaptation in cities and city-regions, an area of where CCW has made a substantial and growing contribution; and (2) finance for adaptation and, in particular, engagement with the private sector. With an expected increase in global climate finance (e.g. the Green Climate Fund), there is a growing need for clear investment proposals for adaptation. The climate change adaptation community is also struggling to engage the private sector. CCW initiated work with the Development Bank of Southern Africa, Natural Resources Canada, and the Private Finance Advisory Network to support business case development for adaptation projects, and to examine models for bridging such projects with private equity. Early success in this initiative is leading to new investments by IDRC in climate finance from 2015 onwards.

When the CCW program began, adaptation was still an esoteric concept, despite several years of active research. Since 2010, IDRC has become an important player in the field of adaptation research within the water sector, through the CCW program. Most important, grantees funded through the CCW program are seen not only as experts in analysis and research, but as thought leaders who drive adaptation forward – finding solutions to improve water quality and availability for the world's vulnerable populations.

Section 1: Introduction

This report describes the Climate Change and Water (CCW) program (2010-2015) and aims to provide the reader with an overview of what we have done, why we have done it, and most importantly, to provide examples of progress in achieving our program-level outcomes. This section outlines the program strategy that we implemented, along with its evolution. Section 2 presents five "outcome stories" that we believe illustrate the impact our program has had. Finally, section 3 highlights some of the lessons we have learned and opportunities for future programming.

Background: Climate Change and Water

Climate change is arguably the most pressing threat to sustainable development across the globe. Its impacts are most felt through changes in the hydrosphere, affecting weather and ultimately water availability for different uses. For developing countries, adaptation to climate change remains a pressing and challenging endeavour, requiring solutions that research can help provide.

Adaptation research is a very young field, where the measurement of adaptive capacity – the ability of a system to adjust to climate change – is still being debated. IDRC first invested in this field through the Climate Change Adaptation in Africa (CCAA) program, which began in 2006. Since then, the field has evolved significantly, despite critiques of sometimes being difficult to distinguish from classic development. We were aware of these challenges when the CCW Prospectus was being drafted, and determined that our niche was best oriented around research that would help improve adaptive capacity. Water enables economic productivity and sustains healthy ecosystems, reinforcing the importance of minimizing long-term impacts from climate change. We decided that a focus on the water sector, which is less apparent in many development donor programs, would allow for the program to benefit from an established constituency and legacy of research, while also generating practical outcomes.

In April 2010, CCW received the mandate from IDRC's Board of Governors to support research that improves adaptation efforts to the water-related impacts of climate change, at the policy level and in practice. The Inter-Governmental Panel on Climate Change (IPCC)'s Working Group II report (2014) firmly connects adaptive capacity to the availability of services such as water, sanitation, and good governance of natural resources. Our support thus focused on improving the delivery of such services and the management of water resources in order to improve livelihoods. We also tested specific adaptation options/technologies that would be considered "no regrets"[1] options.

Program strategy and logic

At the time this report was submitted, CCW's portfolio included a total of 121 projects (research projects, research support projects, and awards projects) for a combined value of $75.3 million (see Annex 11). Of these, 36 CCW projects have been completed and closed, and 85 projects were still active. The CCW program inherited 40 of its projects from previous IDRC programs, as per the table below, which includes 25 at the onset of the program in 2010, followed by an additional 15 from CCAA in 2012.

[1] A "no regret" option is considered to have negative net costs, in that the direct or indirect benefits are large enough to offset the costs of implementation. For example, rainwater harvesting and small-scale reservoirs are considered no regret options.

The majority of the inherited projects were deemed to be relevant to one or more of CCW's outcome areas, and thereafter were considered part of the CCW portfolio. Projects developed in the later stages of the UPE and RPE programs were funded knowing that a program on climate change would soon be launched.

Name of previous IDRC program[2]	Number of projects inherited by CCW
Rural Poverty and Environment (RPE), ended in 2010	5
Urban Poverty and Environment (UPE), ended in 2010	19
Acacia, ended in 2010	1
Climate Change Adaptation in Africa (CCAA), ended in 2012	15

A number of thematic entry-points were outlined in the CCW Prospectus to focus the research that would be supported through the program. CCW themes include disaster risk reduction, water governance, urban and peri-urban water and sanitation, and work in mountainous areas (see Annex 5). To address research gaps, we targeted specific themes in calls for proposals for projects and research awards. It is worth noting that a few of the inherited projects do not fit within the above themes (for example, 105191 Prefabricated Engineered Bamboo Housing), and were therefore not included in any of the synthesis activities organized in the latter stages of the program.

CCW is active in Africa, Asia, and Latin America and the Caribbean (LAC), and to a lesser degree in the Middle East and North Africa. Early in the program, regional strategies were developed to highlight topics of importance and enable team discussions about where we should invest. These strategies were "living documents" and not designed to restrict, but rather help the team focus on different regional priorities as they changed over time. Program Officers (POs) were assigned a primary region of focus and allocated around 80% of their effort towards that region. There were at least two associated POs per region, with the exception of the Middle East and North Africa.

Theory of change for improving water quality and availability

As described in the CCW Prospectus (p.10), we developed a set of graduated program outcomes (see Annex 4) that progress from "minimum" to "medium" to "high" to nuance the degree to which the program would achieve success. Each program within IDRC's Agriculture and Environment (A&E) program area uses a similar approach in developing their respective outcomes. The CCW program would be considered successful in fulfilling all of the "minimum" expected outcomes over the course of its five-year lifespan. Achievements in terms of "medium" and "high" level outcomes would be indicative of a very high degree of success for CCW. Below is a snapshot of the program's three outcome areas:

Outcome area 1	Research funded through the program improves the quality and availability of water for vulnerable communities, reduces risk, and builds adaptive capacity.
Outcome area 2	Improved capacity of researchers to conduct vulnerability, social, gender, and economic analysis in the field of climate change and water.
Outcome area 3	Researchers work closely with policymakers as a matter of practice and communicate their research results to potential users.

CCW's Theory of Change (see Annex 2) was developed by the program's Monitoring and Evaluation Working Group in 2012 (revised in 2013) to reflect how the program has informed change over the course of its duration. The program essentially followed a logical framework, which has helped to ensure that funding decisions are aligned with the overall program strategy. As with many IDRC programs, CCW

[2] The table contains links to the external evaluation reports for the IDRC programs from which CCW inherited projects.

had three main types of inputs – research projects, awards and fellowships, and synthesis and dissemination activities – each of which was administered through an individual grant and funneled into one or more of the program's thematic areas.

The overall objective of the program is to fund research that leads to improved water availability and quality for vulnerable populations. The implicit assumption is that adaptation policies, plans, and action will be strengthened with high quality and evidence-based interdisciplinary research, particularly when supported with early engagement of end-users and improved coordination between stakeholders. On the basis of feedback received from end-users, we were interested in funding research that would respond to one of two key questions: (1) how can immediate short-term threats (i.e. impact of extreme climate events) be reduced, within the context of longer-term climate change? and (2) what existing adaptation strategies are both socially and economically feasible, and make for wise longer-term investments?

CCW's Theory of Change (see Annex 2) outlines the different contributions of the program towards meeting the goal outlined above. For each outcome area, we indicated specific strategies that would lead to program-level outcomes over which we had direct influence. This informed our decisions around which projects and activities to support over the course of the program. The intermediate and development outcomes reflect the "medium" and "high" graduated outcomes described in the CCW Prospectus (p.10), over which we had only limited and indirect influence.

Tools for measuring impact and research quality

We developed a Monitoring & Evaluation Framework for the CCW program in 2010 (amended in 2012), which was used to monitor progress and track performance for each of the program's three outcome areas. The main thrust of the framework has been to optimize existing IDRC tools for monitoring change, namely Trip Reports, Project Monitoring Reports, and Project Completion Reports. We also developed additional monitoring tools to improve the availability of evidence for measuring impact and establish processes for synthesizing data. These include an outcome tracking database, annual reports, reviews of Project Completion Reports, reports from Annual Learning Forums, and synthesis activity reports.

In assessing the quality of CCW-funded research, we referred to a number of the above monitoring tools to consider such factors as scientific merit, scientific integrity and legitimacy, as well as research significance and reach. While we provided a CCW outcome oriented template to partners, it is important to note that we did not insist on partners reporting on comparative indicators at the project level since projects vary greatly in terms of context and subject matter. More important was monitoring progress towards their objectives and fulfilling the terms of their grant.

We presented four "program indicators" in the CCW Prospectus (p.10-11), described below, which we referred to in developing the five outcome stories presented in this report. Each story draws on evidence derived from the above monitoring tools.

Outcome area	Program indicator
1	Production of high quality and credible research results (i.e. peer-reviewed publications, etc.)
2	Evidence of methodological improvements in climate change and vulnerability research
	Increases in the capacity of recipients to produce policy relevant and/or practical contributions
3	Evidence of improved communication and dialogue between researchers and research users

In developing these indicators, we sought to incorporate lessons learned from IDRC's previous round of programming (2005-2010), with particular consideration for the production of peer-reviewed journal articles, the quantity and quality of which was critiqued in several program evaluation reports. While not discarding other forms of knowledge production, standardized peer-review helps to validate findings amongst experts in the field. We also recognize that some criticism has been levelled at the use of journal impact factors as an overly emphasised and imperfect measure of research success (Nature, 2013).

Strategies we used to encourage our grantees to submit their research results for peer-review include having specific criteria in calls for proposals, setting payment milestones in our grants around the production of research outputs (with consideration for the capacity of an institution to accomplish this), and requesting that working papers be written in return for IDRC sponsorship at academic conferences. CCW projects have produced at least 74 peer-reviewed articles (see Annex 12), of which 32% are in open access journals. Given that most projects produce articles in the late stages of their work and sometimes even after a project is closed, we can conservatively say with confidence that another 40 articles will be produced in the coming year.

We also incorporated other forms of peer-review tactics into our program monitoring efforts, such as encouraging partners to host methodological workshops at the outset of projects and organizing synthesis activities between clusters of projects working on a common theme. Although the CCW program emphasized scientific rigour and peer-review, equally important was the potential that the research would lead to impact, change, and the improvement of lives. For instance, some projects, such as the Five-Cities network project in Africa (105868), focused on producing results for use by practitioners and therefore placed less emphasis on the academic peer-review process.

Evolution of the program

The CCW Prospectus states: "given the uncertainties around climate change, the pace of change, and of scientific advances, CCW will have to remain flexible enough to modify some aspects of its programming to be able to respond to emerging issues (p.9)." Some risks to our strategy were known and mitigated at the outset, as described above, whereas others have emerged unexpectedly and required iterative planning to adapt. For example, the field is currently much more crowded than it was in 2010 – a fact that offered both challenges (i.e. too much funding going to too few institutions) and opportunities (i.e. new partnerships with likeminded institutions). The subsequent paragraphs describe some of the most important changes, and how we responded.

The challenge of measuring adaptive capacity

The scholarship on "adaptive capacity" is limited in the climate change field, and clarity on the concept is still elusive even if adaptation efforts are already taking place (IPCC, 2014). Importantly, we received signals from potential research users indicating their ambivalence about the usefulness of the concept. Most communities have more immediate concerns, such as basic service provision, rather than long-term adaptation. Many people we interacted with have difficulty distinguishing adaptive capacity from good development practice. The IPCC has even moved away from the concept – in the Summary for Policymakers of the Contribution of Working Group II to the IPCC's 4th Assessment Report (2007), the term "adaptive capacity" appears 17 times, yet in 2014 it appears only 4 times. This presented us with a dilemma, and so we shifted our focus towards a more modest scale of analysis. For example*, responding to extreme weather* was seen as a priority need for many decision-makers. Secondly, a better

understanding of *what constitutes an adaptation option* was seen to be important. For this reason, a large number of our projects ended up focusing on themes relating to flood management, water scarcity, economic assessment of adaptation options, and coastal vulnerability.

Receiving Government of Canada Fast Start funding

A major influence on the program was the decision by the Government of Canada to contribute $1.2 billion in additional funding under the "Fast Start Climate Finance" banner, announced in 2010. Split over two rounds, CCW secured $30 million in Fast Start funding, which led to 19 additional projects selected through calls for proposals in 2011 (African Adaptation Research Centres Initiative) and 2012 (Adaptation Research Initiative in Asia, Latin America, and the Caribbean). This additional funding doubled CCW's grants budget and enabled us to support larger, more complex projects. Furthermore, it also allowed CCW to play a more active role in supporting the Government of Canada's policy goals. The funding also resulted in additional communication efforts and reporting requirements for the program.

Revising program themes to fill research gaps

CCW themes (see Annex 5) were revised in 2012 to incorporate important work being pursued (e.g. Fast Start projects) and research gaps identified early on in the program by the team and our grantees. For example, we noted that *adaptation in coastal zones* is an increasingly important area of work, considering prevalence of flooding due to sea level rise and storm surges, risks associated with groundwater salinization, the impact of threats on human populations and economic activity, both of which are generally concentrated in coastal areas. We launched a call for proposals on this theme and received a total of 255 concept notes – testament to the demand that exists for funding research on coastal adaptation. In 2013, we funded an external evaluation of this portfolio of work to synthesize findings, which are described in the coastal evaluation report.

It also became clear that *agricultural water management* was a common theme across many projects, particularly amongst those that we inherited from the CCAA program. This theme was also apparent in many of the proposals received in response to the first Fast Start call for proposals in 2011, of which six were funded under the African Adaptation Research Centres (AARC) initiative. To minimize overlap with IDRC's Agriculture and Food Security program, we only funded new projects relating to agriculture in cases where there was a clear link with water-related impacts of climate change.

At the outset of the program, we noted that there was an absence of detailed economic assessments on the costs relating to climate change. This challenge was clearly expressed in the CCW Prospectus: "Good policy requires an understanding of the costs and benefits of action vs. the costs of inaction, and so better and more robust analyses of the economics of adaptation are required (p.9)." As such, a strategy was put in place that involved supporting: (1) the development of a guidance document based on case studies of economic methods[3]; (2) training of researchers in economic analysis; (3) projects to do specific research on the costs associated with adaptation vs. inaction; and (4) the integration of socio-economic analysis in larger, interdisciplinary projects. This strategy played an important role in our program and was intentionally designed to build capacity (see Story 3), challenge disciplinary silos, and generate research results that have practical applications for decision-makers.

Reflecting the interests of the Board of Governors, provision was made to conduct two explorations – one on *climate change, water, and energy* (106298), and a second on *climate change, water, and information and communications technologies (ICTs)* (106395). We hosted a successful workshop for the

[3] This was produced through a grant to the International Institute for Environment and Development (IIED) (106171).

water-energy nexus exploration at the World Water Congress in 2011, which was followed by a call for proposals. However, we decided not to pursue any new work in this area since the quality of the submissions we received was weak and also that the field was already crowded. Our exploration into the water-ICTs nexus generated a long list of research possibilities. So many, in fact, that we decided to fund a research awards program on the Innovative Application of ICTs for Water Management under Changing Climatic Conditions (ICTWCC) (106855) to capture the breadth of the subject, which supported 31 awardees. Although the original intent was to fund larger bodies of work stemming from both explorations, we opted not to due to the limited scope of our ability to make a significant contribution, in addition to the program receiving the Fast Start funds, which required much of our resources.

Lastly, to focus the program, decisions were made to not pursue certain research themes. For example, despite significant success in the early days of the program in our work on safe wastewater use, we did not pursue this theme beyond 2012 since the field had matured and in fact transitioned to focus on health, which is not part of the CCW Prospectus.

Extracting lessons learned through synthesis activities

A key strategy used by the team to ensure research quality was to bring together projects sharing common themes (e.g. *coastal vulnerability* and *urban and peri-water and sanitation*), methodological approaches (e.g. *economic analysis of adaptation* and *climate and impact modelling*), or regional focus (i.e. *Latin America and the Caribbean*, *Asia,* and *Africa*). These specific topics were agreed on at the CCW Annual Learning Forum in 2013, in recognition that (1) we could not cover all topics, and (2) partners had expressed that work in these areas was important to synthesize and review. As a result, a number of synthesis activities were planned through to the end of the program, with the goal of clustering projects from CCW's portfolio to aggregate and share results, and receive peer assessments to inform stronger contributions to the field. Four activities have been completed to date, with three more to follow in the coming year (see Annex 7). While each synthesis was different, in our view the overall strategy succeeded to identify weaknesses, tackle common methodological issues, engage research users, stimulate debate, as well as strengthen project outputs and knowledge transfer. These meetings also focused our communications efforts, and served as an opportunity to provide training to our grantees on how to effectively communicate research results to different users.

Communicating research

CCW developed a range of strategies for disseminating research results to different audiences. Many of CCW's communications activities were planned to coincide with program milestones and our participation at high-profile events relevant to our field of work (see Annex 8), as illustrated in the CCW Program Timeline (see Annex 3). Strategies included inviting our research partners to present in panel sessions at conferences and workshops, profiling research results and notable achievements on the IDRC website, and drawing on our strategic partnerships and affiliated networks to disseminate lessons learned and outputs stemming from our projects. Research results were profiled through the IDRC website, IDRC Bulletin, and IDRC's social media platforms. Furthermore, the program developed the *In Conversation* series of more than 30 video-interviews with CCW-funded researchers.

Another approach we used to amplify the work of our partners and secure influence was to engage in strategic partnerships with organizations sharing common objectives or working in fields relating to climate change, adaptation, and/or water resources management. This opened the door to broader

potential for disseminating research results, as well as opportunities for shared learning, staying abreast of new developments, and identifying potential research gaps. The program developed formal relationships with certain organizations on the basis of mutual benefit and strategic value to the program. Key partnerships include those with Environment Canada, ICLEI-Global, the International Water Resource Association (IWRA), and the Urban Climate Change Research Network (UCCRN). More than just being a vehicle for dissemination, CCW communications activities served to refine the narrative of our program, leading to improved understanding of emerging problems.

Section 2: CCW Program outcomes

This section outlines five significant CCW program-level outcomes presented in the form of outcome stories, where each story is linked to one of CCW's three outcome areas. These particular stories were developed since they resonated well with the team based on our collective experience in the program and there was sufficient evidence available to support them. Each story outlines our approach and key contributions, drawing on examples of project outcomes from CCW's portfolio to highlight important successes and challenges. All of the evidence provided was gathered through the project monitoring tools and synthesis documents described in the previous section. The stories were developed by a subset of the team, and were then shared with the whole team for adjustment and validation.

Outcome narrative	Program-level outcome	Outcome area
Story 1	Improved capacity of vulnerable communities and institutions to adapt to the water-related impacts of climate change	OA1
Story 2	Increased capacity of CCW grantees to use key methods for climate change adaptation research	OA2
Story 3	Increased ability and interest among CCW grantees to work across disciplinary boundaries for climate change adaptation research	OA2
Story 4	Informed adaptation policy through practical research outputs	OA3
Story 5	Enhanced adaptation outcomes through stakeholder engagement in research	OA3

Outcome area 1: Support for research

CCW approached Outcome Area 1 from the perspective that improved understanding of human vulnerability, combined with increased knowledge of threats to ecosystems and the services they provide, is essential for decision-makers and communities to plan how they can best prepare for extreme climate events in the short-term, and adapt to climate change over the longer-term. With this knowledge, it is then possible to identify different strategies or options for minimizing risk and adapting to anticipated changes. When considered together, improved understanding of risks and vulnerability and the testing of adaptation options eventually lead to improved adaptive capacity at the local level, which translates into increased water security in the face of climate change.

The added value we provided through our research support was to fund large interdisciplinary projects that are commensurate with the complexity of climate change, in response to growing demand for research that generates solutions for addressing the enormity of the challenge (Adger N. W., 2005). In the CCW Prospectus, we set out to fund research that would "test strategies for building adaptive capacity" and "identify bottlenecks to the uptake of existing options" (minimum levels of impact), both of which were achieved by the majority of our grantees. In addition, some grantees were successful in "securing additional funding" and "achieving recognition" (medium level of impact). Furthermore, some projects generated results that led to "improvements in adaptive capacity and reduced vulnerability" (high level of impact) – Stories 4 and 5 point to a range of local-level successes in this regard.

In a typical CCW project, researchers begin by assessing climate projections and data on observed local impacts. Subsequently, they pursue primary data collection, such as surveying several hundred to sometimes more than 10,000 households. Survey results are then used to improve models and test theses as to how water quality and availability is being impacted by climate variability and change, as

well as how impacts are affecting people and economies. Finally, working with relevant stakeholders, the teams propose different adaptation options and prepare adaptation strategies.

Story 1: CCW research has helped to build adaptive capacity at the local level

Of the many stories we could tell for Outcome Area 1, we chose to focus on illustrating how our grantees have contributed to research that helped build adaptive capacity. Specifically, the following three areas where we built knowledge are highlighted: (1) expanding knowledge on vulnerability and risk analysis; (2) identifying and testing adaptation options, and (3) shedding light on what adaptive capacity means for communities. Knowledge building in these three areas has collectively helped the CCW program to ***refine the understanding of what adaptive capacity means, while identifying important challenges associated with the concept***. The subsequent paragraphs outline our contribution to the three areas.

Improving our understanding of vulnerability

Two deficiencies concerning vulnerability analysis were identified and addressed by CCW grantees. Firstly, discussions on vulnerability have typically underestimated the importance of underlying drivers associated with gender, poverty, and socio-political exclusion (Hewitt, 1983; Adger, 2006). Secondly, traditional assessments of exposure to water-related disasters (e.g. flooding, drought, and landslides) do not take into account future scenarios informed by climate science. An important achievement has been to combine methods, such as integrating vulnerability analysis with climate modelling in order to have a more precise idea of where intervention is required. The Food, Agriculture, and Natural Resources Policy Analysis Network (FANRPAN) (106550), a Fast Start grantee, has integrated the results from a "human vulnerability index" survey[4] conducted across 10,000 households with climate forecasts and crop models. By overlaying existing household vulnerability data (e.g. poverty, income, and exposure to risk) with climate and crop yield predictions, the research is improving the ability to pinpoint vulnerable "hotspots" in the sub-region (read more about this project).

In Pakistan, the Social Policy Development Center (SPDC), Pakistan Institute of Development Economics (PIDE), and Lahore University of Management Sciences (LUMS) (106857) found that the impact of the 2010 floods in the Indus Basin was made worse for those unable to access basic "gateway" services such as health care, disaster relief, and other forms of support. Women bore the brunt of flood damage as they have unequal access to services, their mobility is often culturally restricted, and their participation in decision-making is limited. People with diverse sources of income did better, as did those with strong social networks or membership in community associations, credit societies, and farmer cooperatives – all indicators that form the basis of adaptive capacity (read more about this project).

A subset of projects in our portfolio looked at threats to ecosystem services and their associated benefits. For example, Wetlands International (106703), is working in India's Chilika Lagoon, recognized as a biodiversity hotspot under the Ramsar Convention, which supports the livelihoods of more than 500,000 through fishing and agriculture. The research team integrated climate scenarios with hydrological models and social and vulnerability assessment tools to specify options for protecting this ecosystem. The findings from the project highlight the importance of investing in water and sanitation

[4] The Human Vulnerability Index (HVI) measures a household's access to a set of five capitals: natural assets, physical assets, financial assets, human capital, and social assets. The HVI data is then disaggregated to allow researchers to more carefully target vulnerable groups, such as women, when proposing adaptation options.

infrastructure, community institutions to secure rights and access to natural resources, and access to information about weather, risks, and agricultural data (read more about this project).

CCW also supported work in mountain ecosystems of Bolivia (104554), Nepal (106034), Pakistan (106487), and Peru (105567). The Himalayan project led by the Institute for Social and Environmental Transition in Nepal (ISET-Nepal) (106034) indicated increases in both minimum and maximum temperatures, with significant pronounced warming at higher elevations. This confirmed that similar findings from previous studies in the Andean mountains were also relevant to the Himalayas. The research team also found that precipitation is expected to be more variable, with irregular distribution and higher incidence of intense rainfall. Furthermore, the depletion of local water sources fed by snow melt in the high mountain regions is affecting availability of water for households and agriculture. The transect approach used by this project was effective in accounting for the great diversity and complexity of the region's social-ecological systems, and was helpful for applying findings at a broader scale (read more about this project). Across each of the CCW-funded projects in mountain ecosystems, the absence or excess of water weakens existing agricultural activities and forces people to adapt in sometimes drastic ways, such as migration.

Two projects focused on understanding vulnerability to climate change in small-island states (SIDS), including in one in the Caribbean that focused on Barbados, Grenada, Jamaica, and Trinidad and Tobago (107096), and one that focused on Cape Verde, and Sao Tome and Principe off the coast of West Africa (105838). The Fast Start project led by University of West Indies (UWI) (107096) is conducting an in-depth analysis of several small-island states in the Caribbean. The residents of one particular island, Carriacou, are completely dependent on rain water. UWI has concluded that, given the fragility of the island's ecosystem, climate change will render the island inhospitable for its 7000 inhabitants within several decades. The implications are grave, especially considering that several dozen Caribbean islands face similar challenges.

A number of projects identified both flood risk and water shortages in unplanned and informal urban areas, including urban watersheds in Cape Town (105674, 105868), and in Dar es Salaam, Maputo, Port-Saint-Louis, and Windhoek (105868). In India's Arkavathy River Basin, where the City of Bangalore is located, the Ashoka Trust for Research in Ecology and the Environment (ATREE) (107086), a Fast Start grantee, has found that a combination of climate, pollution, and demographic pressure is having a dramatic effect on the 8.6 million people living in the basin. They have proposed modifications to the existing plans for wastewater use in order to improve efficiency and reduce the demand for new water supply (read more about this project).

In Chile, the Maipo River Basin is a hub for agriculture, mining, and power generation, and is also one of the country's most important wine-producing regions. The city and its peri-urban area, home to 6 million people, is at risk of severe water shortages due to basin level changes in hydrology caused in part by climate change, with projections indicating a decline in precipitation of up to 30% before 2100. The *Pontificia Universidad Católica de Chile* (PUCC) (107081), a Fast Start grantee, is directly engaging a broad range of stakeholders, including the private sector, and is researching options to adapt to future water shortages in the Maipo Valley (read more about this project).

Understanding how existing forms of vulnerability will be compounded by climate change under different scenarios is critical for being able to assess what forms of adaptation are most suitable for reducing risk, and improving local adaptive capacity.

Testing adaptation options in the water sector

Adaptation is often grouped into two categories: (1) *autonomous adaptation* measures, those practiced by people in response to threats that they themselves observe, and (2) *planned adaptation* measures, which are generally driven by authorities and institutions tasked with long term planning (ISET-IDRC, 2008). Research projects supported by CCW have helped to inform both planned and autonomous adaptation strategies at the local level, by helping to identify and test options for improving water availability.

Across our portfolio, the most common features of autonomous adaptation that we observed included income generation (i.e. through new markets and entrepreneurship), strengthening social networks for mutual support, diversifying livelihoods, and migration. Most adaptation in remote, high altitude places is autonomous. ISET-Nepal (106034) found that Nepalese farmers are diversifying livelihood strategies at the local level by expanding ecotourism activities associated with longer dry seasons in the Himalayan trekking routes. To adapt, communities have resorted to migration (to India and the Middle East, mostly) and to employment in the tourism sector where possible in the upper Himalayas. Other autonomous adaptation measures include crop diversification and vegetable farming in Himalayas, and aquaculture and floriculture related activities in the Andes. In Peru, the *Instituto Geofísico del Perú* (IGP) (105567) documented traditional practices used by local communities to minimize the impact of frost on crops, which included irrigating crops before sunset and covering the plants with mulches and straw (read more about this project).

In slum areas of many of the cities where we work, including Cape Town (105674), Ouagadougou (106549), and Dakar (107026), forms of autonomous adaptation are already taking place. Findings indicate the need to value informal systems when developing adaptation plans (read more about the Cape Town project and the Dakar project).

In addition to differentiating between autonomous and planned adaptation measures, many of our grantees categorized adaptation as either "hard" infrastructure-oriented options (e.g. a sea wall or pumping station) or "soft" options (e.g. improved governance or stakeholder engagement). Both serve a purpose and are not mutually exclusive. The Fast Start project led by the Chinese Center for Agricultural Policy (CCAP) at the Chinese Academy of Sciences (107093) documented adaptation measures in China's Northern Lake and Poyang regions at three different levels: household, community, and national. Within each level, adaptation practices were categorized as either engineering or non-engineering measures. The former generally involved high capital costs and maintenance, whereas the latter included measures such as water-saving technologies, agricultural practices, risk management, and building local institutions (read more about this project).

When developing pilot projects on adaptation, CCW focused on options that would be scalable and complement ongoing government adaptation efforts. For example, in Tunisia, a rainwater harvesting project led by the Fédération tunisienne des clubs UNESCO-ALESCO (104396) helped to enhance the adaptive capacity of marginalized populations by promoting rainfall and grey water reuse in urban and peri-urban agriculture (Bouraoui, 2013). This was found to have a 17% internal rate of return over 20 years. In Morocco, a project led by the International Institute for Environment and Development (IIED) (106171) undertook a cost-benefit analysis of a drip irrigation technology to investigate whether the current level of subsidy provided by the Moroccan government is sustainable. This particular adaptation technology helped to reduce the water use by 56%, compared to flood irrigation. Furthermore, output of citrus fruits rose by 40% under this new system and groundwater resources also increased (Chumbwera, 2011) (read more about this project).

Many of our grantees were successful in identifying adaptation options that sustain agricultural yields and minimize water consumption in the face of drought or changing precipitation patterns. In Kenya's Trans Mara District, the Kenya Agricultural Research Institute (KARI) (106664), a Fast Start grantee, demonstrated soil and water conservation technologies for improved crop yield. Cover crops were used for soil retention and led to yield increases varying between 27% and 128% for different crops (read more about this project). In India, the Punjab Agricultural University (106591) installed simple devices (tensiometers) for assessing soil moisture on 600 farms and found that farmers used 30% less water as a result of these monitors (read more about this project).

Until 2010, few studies had assessed the economics of adaptation in the water sector (i.e. costs and benefits of different adaptation measures) to understand the trade-offs for local-level adaptation strategies (Cartwright, 2013a). Understanding what options are feasible for supporting long-term adaptation, particularly with respect to water security, is crucial for informing integrated planning and instituting suitable policies. Research in three countries of Southeast Asia (106326) – Vietnam, Cambodia, and the Philippines – also points to the fact that as far as we are able to assess long-term benefits, non-technical options (such as early warning systems for climate-related disasters in densely populated areas) have a higher benefit-cost ratio than infrastructure investments.

CCW has contracted ICLEI-Canada and the University of Waterloo to assess the range of adaptation options stemming from our research support in a catalogue of options (107599), including economic assessments where possible, and which will present different entry points for different end users. It is important to note that all of the above examples are practical and actionable no/low regrets strategies. Based on our experience, we see the key to success in planning adaptation as two-fold. Firstly, being able to communicate climate risks well, despite the uncertainty inherent in climate projections, and second, being able to identify the correct incentives, hence, the focus on adaptation economics in much of our portfolio.

Building adaptive capacity at the local level

To build adaptive capacity, we felt it was important to emphasize research that focused on local context in order to lead to more relevant local solutions. The University of Cape Town project (105674), for example, highlighted that mobilizing communities and local governments to participate in planning and governance has to be understood within the wider socio-political and institutional contexts in which it is attempted (read more about project). Across CCW's portfolio of coastal projects, projects have concentrated on researching "risk awareness and communication", as opposed to "quantifiable interventions that reduce risks" (Jobbins et al, 2014).

A central element of improving adaptive capacity relates to behavior change which, in our view, is closely linked with how information is accessed and used. Several CCW-supported projects used ICTs to improve people's access to timely data and information, which helped to inform changes in daily practices that support adaptation. The "Cattle Corridor Project" in Uganda (106594), for example, used ICTs to address water-related challenges by investigating how communities can plan, respond, and adapt. Seasonal forecasts, early warning messages, and market data was shared through weekly and monthly FM radio broadcasts (reaching 100,000 farmers), mobile phones (reaching close to 20,000 farmers), and at community gatherings. A number of adaptation options[5] were tested in four districts, and it was found that the use of ICTs had a significant positive impact in terms of reducing crop loss and improving local adaptive capacity (read more about this project). In Vietnam, the National Institute for

[5] Adaptation options included rationing water use, planting drought resistant crops, and planting early maturing crops, among other.

Science and Technology Policy and Strategy Studies (NISTPASS) (106707) focused entirely on designing and testing risk communication tools for various audiences in the three cities under study (read more about this project).

CCW-supported projects also examined the role of formal and informal institutions in adaptation, in that their support requires flexibility and divergence from the "business as usual" approach (Swanson et al, 2010). For many institutions, the cross-cutting nature of climate change and the complexity of supporting adaptation is challenging enough that wholesale reform may be required. Take the case of Thailand, for example, which experienced its worst flooding disaster in half a century in 2011, inundating large areas of the city, severely affecting the industrial sector, and raising important questions about the sustainability of the country's economic development. According to World Bank estimates, this disaster caused $46.5 billion USD in damage and reduced Thailand's economic growth potential. In response to public outcry over mismanagement of the disaster and poor planning in the watersheds, the government drafted a Flood Management Master Plan for the Chao Phraya River Basin. However, researchers at the Thailand Development Research Institute (TDRI) (107094), a Fast Start grantee, discovered that there are more than 50 laws and over 30 state organizations under 7 Ministries with overlapping mandates dealing with water management in Thailand. Findings show that institutional reform is clearly needed to better prepare for and prevent future flooding events.

Informal institutions are also central in adaptation efforts and their role is often less understood. For example, the project led by IGP (106714) analyzed the role of informal institutions in governing resource extraction and wider supply chain management for the mangrove ecosystem in Tumbes, Peru. They found that such institutions were key contributors to the ecosystem's resilience to external shocks and stresses (read more about this project).

Other projects, such as the work led by IIED in the Río de la Plata of Argentina and Uruguay (106597) and the Five Cities network in Sub-Saharan Africa led by ICLEI (105868), have identified land-use practices and other formal and informal urban development processes that contribute to increasing exposure to climate extremes (read more about the Río de la Plata project). For example, set-back lines have been proposed as a result of findings from the Cape Town (105674) and Río de la Plata (106597) projects, which serve to prevent development in areas that are vulnerable to storm surges. In the case of Cape Town, the municipal government has implemented this measure, a success resulting from close collaboration with affected communities and recognition of informal governance structures, and the city now provides leadership across South Africa to urban planners from other coastal cities. This is illustrative of planning actions that have the potential to influence long-term development in the context of climate risks, but that require enforcement and a supportive policy environment (read more about this project).

Peri-urban areas are regions that typically fall outside of jurisdictional boundaries and as a result are often under-serviced or neglected, particularly concerning sanitation and access to water. CCW-funded research in peri-urban locations of Bangladesh, India, and Nepal, led by the South Asia Consortium for Interdisciplinary Water Resources Studies (SaciWATERs) (106248), affirmed a lack of formal administrative systems in these areas for integrating the various agencies that would need to respond to climate change related risks, both in terms of policy and practice. The research team worked closely with civil servants to build their understanding of water security needs in these areas, and to build institutional capacity to address them (read more about this project).

The above examples demonstrate how our partners have helped reduce barriers in terms of incentivizing behavior change for adaptation, and how they brought together different stakeholders to work collaboratively on adaptation efforts. ICLEI's project on pioneering climate change adaptation in Sub-Saharan Africa (105868) concluded that adaptation is often more dependent on a process of social and institutional change than on strategies and plans. These projects highlight a broader learning that adaptation is never simple, but rather requires a combination of strategies, and engagement with multiple stakeholders and institutions at different scales to be effective. The role played by CCW-supported researchers in helping institutional adaptation is discussed in more detail in outcome stories 4 and 5.

Adaptation is also inherently affected by uncertainty – specifically, the uncertainty associated with assessing probable impacts of global climate change at the local level. Moreover, it is very challenging to measure avoided impacts over the long term that may result from adaptation. Typical indicators used by our partners to measure adaptive capacity ranged significantly across projects, and included percentage water savings, access to services, income security, social infrastructure/political voice, and exposure to hazards amongst many others. Some projects also referred to wealth and education as indicators of adaptive capacity. Based on this, we can conclude that many facets of adaptation relate to classic discourse on sustainable development – good practice in this regard should be adaptive by its very nature, while supporting communities to become more resilient in the face of climate change.

BOX 1: Securing new funding for high-quality research

Many of our grantees were successful in securing other sources of funding for their research (medium level of impact). *Agua Sustentable*'s work on adaptation in Bolivia (104554), once a pioneering effort, has since become one their four thematic focus areas. The institution is now recognized as an Andean regional leader in the field of water management and climate change in glacier-fed environments. Their strength in science and in participatory research with vulnerable communities has helped attract donor interest, with at least seven new projects being funded by the Danish International Development Agency (DANIDA), Christian Aid, OXFAM, Nordic Development Fund, Inter-American Institute for Global Change Research (AIA), and Diakonia. In India, SaciWATERs was successful in securing a grant from the Department for International Development (DfID) and the Netherlands Organisation for Scientific Research under the jointly funded Conflict and Cooperation over Natural Resources in Developing Countries (CoCoon) program. Also in India, one of our Fast Start grantees, ATREE (107086), was recently awarded $2.5 million CAD in funding from Norway to support their work on biodiversity conservation, environmental governance, and climate change in India, and to provide fellowship support to 40 doctoral students. ISET-Nepal led two successive IDRC-funded projects on adaptation in Nepal (103232 and 106034), which attracted donor funding for at least four new projects on this theme from the Asia Foundation, British Geologic Survey, IDRC's Think Tank Initiative, Action Aid Nepal, and Climate and Development Knowledge Network. The above successes corroborate the high quality research of our grantees, and may not have occurred without existing grants from CCW.

Outcome area 2: Capacity building

The CCW Prospectus notes that, as a baseline, the "capacity of many researchers in the field of climate change and water to conduct vulnerability, social, gender and economic analysis is weak. The potential for multi-disciplinarity to contribute to climate change adaptation has not been realized (p.10)." Most of the literature on climate change adaptation is less than a decade old. In response, the program sought

to increase the capacity of CCW-supported organizations, researchers, and students to conduct interdisciplinary research on climate change adaptation (see Annex 6). Capacity building is the practical contribution that our financial and technical support makes in terms of improving the ability of grantees[6] to analyze complex sets of data and to effectively communicate results to support adaptation. The application of sound research methods, combined with an interdisciplinary approach, is needed to strengthen adaptation policies, plans, and actions.

CCW's approach is consistent with IDRC's Evaluation Unit Guidelines for Good Practices on Capacity Development. We adopted a flexible programming approach, where funding can be used to help fill identified capacity gaps through a variety of means, including training activities and hiring external support. We seek to harness existing capacities in the South to support teams and build on expertise, both within the research team and within the region. Building partnerships is also critical in this regard, by drawing on existing networks to forge inter-organizational linkages. More than 60% of our portfolio (77 projects) had at least one capacity building component, where 27 projects contributed 50% or more of their effort towards capacity building. Two stories clearly emerged for this outcome area, which were identified as part of a comprehensive team exercise during the program's 2013 CCW Annual Learning Forum.

Story 2: Our support has led to improved capacity of researchers to select and refine appropriate methods for adaptation research

A number of our grantees refined methods of assessing vulnerability, mapping risks, evaluating adaptation options through economic analysis, and fostering dialogue and learning, which are being used to influence other research organizations and policymakers (high level of impact). In addition, we worked to increase the capacity of CCW-supported researchers to both select appropriate methods and to employ a variety of methods in climate change adaptation research. We believe that ***our support has led to increased capacity of researchers to conduct sound and relevant adaptation research***.

The need for better methods to assess vulnerability

Two approaches were used to support our partners in improving vulnerability assessment methods. Firstly, we funded strategic projects led by high-capacity organizations, including those led by the University of Cape Town (105674), ISET-Pakistan (106487), and IIED (106171), as well as projects led by organizations with strong policy linkages, such as FANRPAN (106550), in order to benefit from their expertise in the field and to encourage new developments in methodology that would lead to improved understanding on how to identify populations that are most at risk from climate change impacts. Secondly, we encouraged knowledge sharing and mentorship between our stronger and weaker Southern partners by brokering relationships and supporting training activities. The success of this approach has been validated by our partners.

A number of our grantees have gone beyond simply applying existing methods to instead refine them for application in particular contexts. Some grantees have even developed entirely new and innovative ways of assessing socio-ecological vulnerability to climate change, across entire regions (high level of impact). For example, ISET and ISET-Pakistan initiated a scoping study (106487) to examine the impacts of the severe flooding of the Indus River in 2010 from a sociological and economic perspective. In

[6] CCW's Outcome Area 2 focuses on building the capacity of researchers specifically, whereas Outcome Area 1 focuses on building the adaptive capacity of communities, and Outcome Area 3 focuses on working closely with policymakers.

collaboration with local research partners, the team used Shared Learning Dialogues[7] and a matrix that rates a variety of socio-economic factors to determine (1) how communities were affected by different climate risks, and (2) how communities might respond to such risks in the future. The resulting index benefited from having been extensively validated through community dialogues. This "local ranking approach" has since been used to facilitate the implementation of local adaptation plans (read more about this project).

In India, the project led by Jagori (105524) improved a tool for assessing impacts on women from both rapid and longer-term urban change. This project was the first to apply a Women's Safety Audit[8] to water and sanitation issues. The women of Bawana and Bhalswa, resettlement colonies on the outskirts of Delhi (two of the project's study sites), are now promoting their right to better services. The project also produced a handbook, Women's Rights and Access to Water and Sanitation in Asian Cities, on how to apply this method in other communities of low-income countries (read more about this project).

BOX 2: Mainstreaming gender: Still a challenge, despite progress

Generally, projects focused on vulnerability had more significant gender based learning. For example, the South Asia peri-urban project (106248) learned through gender-disaggregated household surveys that women from marginalized communities are particularly vulnerable in terms of water security. Public tube wells in Khulna, Bangladesh or stand posts in Kathmandu were not only at a considerable distance for women to fetch water on a daily basis, but they also provided little privacy in terms of bathing. CCW awards programs were also effective in helping develop gender specific research. Adaptation H2O awardees examined how roles, rights, and knowledge differ between men and women, and the impact this has on adaptive capacity. One awardee found that women had specific ecological knowledge that allowed them to adapt to changing environmental conditions, as in the case of women fish sellers and traders in Thailand (Lamb, 2011). This knowledge enabled them to assess the impact of water levels on income from fish selling in the Salween River in Thailand. Another awardee researched gender-based perspectives on drought in rural Eritrea and demonstrated the value of specific government policies that safeguard women's tenure rights (Tesfamariam, 2010). Other projects have also made headway in differentiating gender-specific vulnerability (for example, 105524, 106299, and 106487). One major gap has been the lack of assessment of how gender differentiated time and risk preferences affect the adoption of different adaptation options and technologies. This point is being tackled by a grant initiated in 2014 with the Ethiopian Development Research Institute (107745). Despite encouraging progress, integration of gender analysis was not consistent across our portfolio.

Addressing the economic impacts of climate change and the benefits of adaptation

Our approach to supporting capacity building of researchers to conduct economic analysis in the water sector is similar to that used in the case of vulnerability analysis. This included supporting strong partners such as the *Centro Agronomico Tropical de Investigacion y Ensenanza* (CATIE) (106316), IIED (106171), and Hue University (106326) to benefit from their expertise in the field and to encourage them to identify methodology gaps. We also included specific language in our calls for proposals that signalled the importance of economic analysis in adaptation research, as a way of encouraging potential

[7] ISET defines Shared Learning Dialogues as "a stakeholder engagement process born from strong roots in participatory action research." Furthermore, it is "an approach to participatory planning and problem solving in complex situations, characterized by non-extractive, mutual learning among participants (ISET 2010)."

[8] This is a method developed in Toronto in 1989 that identifies and assesses ways of enhancing the safety of a place or service for women, by highlighting their experiences as expert knowledge within their neighbourhood.

grantees to integrate this method into their research design.[9] Economic analysis was also included as a suggested research theme in the Adaptation H2O Awards Program and CCW's fellowships programs.[10] Training on economics is embedded in many CCW projects and ranges from support and training activities for students, to nation-wide training on climate change research methods, such as through the Latin American and Caribbean Environmental Economics Program (LACEEP) (106316). Due to demand, we included sessions on economic analysis in each of our synthesis activities to foster peer-exchange amongst our grantees. Finally, we also used a direct approach by organizing a capacity-building workshop (106980) for all seven AARC projects in September 2012, to enhance the component of their research focused on economic analysis of adaptation options (read more about this project).

It is our view that the projects on the economics of adaptation have led to important results and have helped further the field. In the project on water security in peri-urban South Asia led by SaciWATERs (106248), the capacity of the Bangladesh research team in Khulna (mostly engineers) were mentored by Dr. Purnamita Dasgupta, an IPCC lead author, member of the South Asian Network for Development and Environmental Economics, and a grantee of IDRC's Think Tank Initiative. The economic evaluation of proposed measures for providing water to Khulna, Bangladesh showed the net benefits of improved drainage and management of freshwater flows to the Mayur River. Other significant successes in building capacity in economic analysis are referenced in the table below.

Outcome area 2 achievements related to economic analysis	Illustrative evidence
Researchers are actively applying economic methodologies to inform improved management of water resources (minimum level of impact).	The external evaluation of CCW's coastal projects (Jobbins et al., 2014) found that five of the 13 projects surveyed (105515, 106548, 106551, 106703, 106706) were using economic appraisal methodologies to assess the feasibility of different adaptation options for addressing climate threats such as saltwater intrusion, sea-level rise, and wetland degradation.
CCW researchers are also finding that non-infrastructure options are much more cost-effective than "bricks and mortar" projects, and should therefore be prioritized (medium level of impact).	An economic analysis of adaptation options was undertaken by the College of Economics at Hue University (106326) in collaboration with the Royal University of Phnom Penh and the University of the Philippines Los Banos. Options selected for cost-benefit analysis include construction of a water reservoir to address drought problems in Odong district (Cambodia), a technology-based early warning system (Philippines), and upgrading a flood control system in Quang Dien district (Vietnam). In each case, the Benefit-Cost Ratio (BCR) was positive, with the early warning system in the Philippines being by far the best investment at a $43 benefit (mostly in avoided damage) for each $1 invested. The BCR for the other options was closer to 3 to 1.
Researchers are contributing to academic debate through peer-reviewed publications and a methodological guidance report (medium level of impact).	The Guidance report on stakeholder-based cost-benefit analysis produced by IIED (106171) has been shared with CCW partners, and is beginning to be cited in academic publications and reports. Other projects also produced outputs that contributed to academic debate (106326, and 106316).
Some grantees have been recognized for their expertise and were called on to support initiatives led by other stakeholders (high level of impact).	Muyeye Chumbwera, Tom Birch, and Mintewab Bezabih, researchers involved in the development of the above-mentioned Guidance report on stakeholder-based cost-benefit analysis and country case studies (106171) were contracted to prepare a report on "Planning and costing agriculture's adaptation to climate change" funded by DfID. Rodney Lunduka, the Principal Investigator initially working on the Malawi case study, was subsequently hired to be the leader for the overall project, and has also been invited to lead training sessions on economic analysis for several activities within the Fast Start African Adaptation Research Centres (AARC) initiative.

[9] For example, in the Fast Start II call for proposals, one explicit goal of the initiative was to "Build a strong base of scientific evidence on adaptation options, including rigorous economic analysis to inform decision-makers about the most effective use and targeting of climate change funding".

[10] For example, four of the 16 Adaptation H2O award recipients pursued research on assessing the economics of adaptation. See additional examples for the following awards and fellowship programs: Innovative Applications of ICTs (106395), ACCFP (103691), and SAWA (107240)

Researchers identified methodological gaps and piloted new methods in economic analysis (high level of impact).	For example, as part of the LACEEP project (106316), researchers conducted a literature review and organized a stakeholder workshop to identify priority themes, geographical hotspots, and methodological gaps. Senior researchers associated with the project conducted five pilot economic analyses, which involved using new methodological approaches for estimating the economic impact of climate change for hotspots within the LAC region.

One considerable challenge we have experienced is the inability of researchers to determine how to integrate climate data in their economic assessments. A grant with the Grantham Institute at the London School of Economics led by Sam Fankhauser, a leading expert in the economics of climate change, will involve aggregating research findings from across CCW's high-performing projects in this area of research as part of an upcoming synthesis activity (107593). It is expected that this activity will further propel this important field of research and help inform how economic assessments of adaptation at the local level are performed.

Enhancing capacity to conduct climate and hydrological modelling

Similar approaches were used to increase the capacity of researchers to conduct and integrate climate and hydrological modelling as with methods of vulnerability and economic analysis. At the start of the program, only a small portion of CCW's grantees in the LAC region were deemed by our team to have expertise in climate at the global scale, and partners were also found to have only limited experience with downscaling of climate data for application at the local level. By drawing on expertise from high-performing institutions in both the South, such as the Climate Systems Analysis Group (CSAG) at the University of Cape Town, and the north, including the Stockholm Environment Institute (SEI),[11] we have seen rapid growth in the quality of integrated modelling for some of our CCW-supported projects.

Climate and impact modellers working in a southern context face significant challenges accessing appropriate data and models, while planners and policymakers face barriers in applying and using climate information. CCW has more than 20 projects with significant modelling components. A number of them have had notable success in bringing together both "ends" of this problem, by integrating socio-economic and biophysical model outputs and applying them in a local context to produce tangible results. To further strengthen the modelling capacity of partners, CCW is planning a synthesis workshop on integrated climate change modelling and policy linkages for adaptive planning (107682), led by CSAG, which will take place in the fall of 2014. This workshop will build on the collective strengths of the above-mentioned 20 projects and the University of Cape Town's position as a hub for climate information in the Southern hemisphere, and will serve to strengthen the Southern climate modelling community of practice.

Supporting an emerging community of practice in adaptation

Awards and fellowships have also proven to be highly effective vehicles for building research capacity. In many cases, we included specific themes in the application criteria, so as to ensure that this form of support addressed research gaps in the program identified by the team and also helps in our forward thinking. We far surpassed the minimum target of supporting 15 researchers (minimum level of impact) that was listed in our graduated program outcomes, which in retrospect was too modest of a goal (see Annex 6). For example, 31 graduate students were supported through the Research Awards Program on the Innovative Application of ICTs in Addressing Water-Related Impacts of Climate Change (106855) led by the University of Nairobi (read more about this awards program), 16 graduate students were

[11] Two CCW-funded projects (107081 and 107097) used climate modelling software systems developed by SEI, including the Water Evaluation and Planning (WEAP) system and the Long-range Energy Alternatives Planning (LEAP) system.

supported through the Adaptation H2O Awards Program (106299) (read more about this awards program), and 5 junior researchers were awarded fellowships as part of LACEEP (106316). Furthermore, the recently launched South Asian Water Fellowships Program (107240) will support up to 60 emerging interdisciplinary professionals in the water sector, 80% of whom will be women, to undertake post-graduate studies on climate change adaptation, water, and food security in South Asia.

Our capacity building efforts also included bridge-building between researchers and research users. For example, 17 Adaptation Policy Fellowships were awarded to early and mid-career practitioners and policymakers through the Africa Climate Change Fellowship Program (ACCFP) (106391) to support climate change communication between scientists and decision-makers, and in developing recommendations for action.[12] Another example involves an intensive training workshop on cost-benefit analysis of adaptation in Lesotho, Malawi, and Swaziland that brought together 31 individuals (including students, research supervisors, and development practitioners) through the FANRPAN-led project (106550).

Other efforts included supporting education initiatives to help a broader group of stakeholders improve their understanding of adaptation. For instance, the project led by the *Centro de Educación y Tecnología para el Desarrollo del Sur* (CET Sur) (106963) invited practitioners from Chile's Araucania region to participate in a course on climate change adaptation. The *Centro del Agua del Trópico Húmedo para América Latina y el Caribe* (CATHALAC) (107084) offered a diploma course on adaptation to climate change to 20 technicians, policymakers, and private sector representatives from across Central America and the Caribbean who are working on water management and climate change adaptation. Some projects also contributed to new curriculum development. For instance, the Asian Institute of Technology in Thailand (106960) now offers a MSc degree program in Climate Change and Sustainable Development and UWI in the Caribbean (107096) regularly updates the curriculum for their MSc degree program in Natural Resources and Environmental Management, to reflect new developments in the field of climate change adaptation.

Our overall approach to capacity building involved empowering high-performing grantees to innovate in their application of methods for adaptation research, which has led to a number of them receiving prestigious awards and recognition (see Annex 9), to broker South-South opportunities for sharing learning and providing training, and to equip lower-capacity researchers with the tools necessary to select appropriate methods for generating relevant findings. Furthermore, we supported the development of an emerging community of practice in adaptation by expanding capacity building efforts to include research users.

Story 3: Through our insistence on interdisciplinarity, many grantees are better at applied and relevant research

Acknowledging the complexity and novelty of the climate change adaptation research area, we embraced an interdisciplinary approach within the CCW Prospectus and have incorporated this as an important aspect of our research-support strategy. The CCW Prospectus highlights that "common to many projects will be support for multidisciplinary teams (p. 11)." Furthermore, this is clearly referenced in the graduated outcomes for the program, which states that "multidisciplinary approaches … are being used by and influencing other research organizations and in some instances, policymakers (p. 10)." By

[12] A total of 43 fellowships were offered through the ACCFP.

encouraging grantees to work across disciplines, we believe that ***CCW-funded research is generating adaptation solutions that are more relevant and consider the complexity of a range of socio-economic contexts***.

Our strategy involved two approaches. First, we promoted the inclusion of diverse scientific disciplines in every CCW-supported project. Second, we implemented a range of mechanisms to promote the sharing of scientific knowledge across diverse disciplines. In support of this strategy, the team specifically hired staff with expertise in two key fields, environmental economics and hydrology, to ensure that we could offer the appropriate technical support demanded from our portfolio. There are no less than seven scientific disciplines[13] represented in the CCW team, allowing us to provide support in a range of conceptual and methodological domains.

We explicitly included text in our prospectus and in our calls for proposals that encourages grantees to use a multi-disciplinary approach in their research – proposals with a narrow disciplinary focus were rejected. Throughout the review and development phase of proposals, the team would identify gaps in disciplinary expertise and discuss this with the proposing researchers to identify suitable mechanisms for filling such gaps. We also facilitated the interaction of grantees with other Southern-based institutions, as discussed in Story 2.[14] Steering committees with members from diverse scientific disciplines were key in larger, more complex projects and in some cases, were insisted upon by IDRC for more effective governance.

Bridging across disciplines to generate stronger solutions

We see several key results of the CCW effort to focus on interdisciplinarity. Firstly, we observe an increased ability and interest in working across disciplinary boundaries. In most cases, inter-disciplinary research – the point where boundaries between disciplines are broken down – was evident, as complex solutions were proposed as a result of the research. Virtually all of CCW's projects include researchers from the natural and the social sciences. For example, the University of West Indies leads a project focussing on small island states in the Caribbean (107096), which was recently awarded a UWI Research Team Award for its interdisciplinary collaboration. In some cases, success was also evident in the publication of papers and reports with multiple authors from diverse disciplines. Examples include a paper produced by researchers at ATREE in India (107086) on approaches to research for practicing integration in the water sector (Srinivasan, 2013) (read more about this project), and another produced by the research team from the *Consejo Nacional de Investigaciones Cientificas y Tecnicas* (CONICET) (106601) on soil and groundwater salinity in Argentina (Amdan, 2014).

For many of our grantees, complex projects involving large teams are no longer a novelty or perceived to be overly difficult to manage. We have noticed an evolution in some institutions towards institutionalizing interdisciplinary approaches, some of which can be attributed directly to CCW support. Take for example the IGP, a government research centre that for over 5 decades has focused exclusively on natural sciences – geophysics, meteorology, and seismology. Largely influenced by findings from the CCW-supported project they led (105567), the centre decided to create a whole new department within

[13] These include: environmental economics, agricultural economics, biogeochemistry, urban and environmental planning, hydrology and modelling, geography, and social sciences.

[14] Examples include the LACEEP (106316) and CSAG-UCT (107682) led projects, where the latter aims at strengthening a community of practice among climate and hydrological modellers in developing countries to support adaptation research. In some cases, collaboration with developed country centres was deemed as most appropriate and we facilitated the interaction. Such institutions include the Stockholm Environment Institute , who is providing training and technical support to various projects (107097, 107081, 107282) on the use of the WEAP; the Columbia Earth Institute, involved in projects 107562 and 106711; the project led by the University of Waterloo (106711); and participation from the University of British Columbia in project 106344.

the centre for social studies. The IGP's Geophysics and Society division is now headed by Alejandra Martinez, the former PI of the above-cited project. This is a significant and unforeseen achievement. Another project led by the engineering department of the *Universidad Nacional Autónoma de México* (105707) was encouraged to engage the university's social sciences division in the project. This enabled the implementation of social life cycle analysis for water management in Mexico. Although collaboration between natural and social sciences is difficult to achieve in large academic institutions, it can clearly lead to more applicable and relevant solutions.

Challenges to interdisciplinary/inter-institutional research

Work in interdisciplinary teams does not happen easily or frequently. There is a long tradition embedded in academic institutions, NGOs, and government organizations to work in silos and there is often little incentive to break these barriers. Inter-institutional and interdisciplinary collaboration involves high transaction costs and not all are eager to take on the challenge. Additionally, most national funding agencies promote focused disciplinary research. Interdisciplinary work can lead to discreet packages of work that are not always well integrated. The need for strong leadership to help teams synthesize findings from across different disciplines is critical for exploiting the value of interdisciplinary work.

Outcome area 3: Informing policy

The IPCC's definition of climate change adaptation "recognizes that future climate changes will occur and must be accommodated in policy (IPCC 1996, p. 831)." This definition underlies CCW's Outcome Area 3. Influence is seen by CCW as a progression from limited, inflexible, and supply-focused water management and climate change policies on one end of the spectrum to an adaptive policy environment (listed as our highest level of impact) on the other. This progression is initiated when research teams develop and communicate feasible options to policymakers and work closely with them as a "matter of practice" (minimum impact). In this way, policy implementation can be informed at different levels, and change may be affected by the program's research (medium impact).

Our partners are expected to leverage IDRC funding and technical support to inform an environment in which policies evolve with needs. In the context of the program, this relates to a broad group of development planning and policy issues that extend beyond climate priorities – including urban planning, water management, conservation, and emergency management / disaster risk reduction – which are ultimately essential to adaptation (Dovers 2009; Smit and Wandel 2006). While having "*researchers work closely with policymakers*" is ideal in theory, it remains rare in practice.

As per the CCW Dashboard, 80 of CCW's 113 projects had some level of contribution to OA3, with the vast majority of these (90%) contributing up to 30% of their effort towards this outcome area. Of these 80 projects, 27 achieved the minimum outcome of working with policy-practitioners as a matter of practice. The medium criterion, where research informed policy at a municipal or national level, was reached by 18 projects, and four projects achieved the highest level of policy impact. Importantly, almost all projects reporting policy impact noted that policy-practitioner engagement was critical, supporting our assumption that regular interactions as part of working practice are the precursor to other changes. In practice, CCW has tried to ensure that this approach is incorporated in the proposals and activity plans of all our supported projects. This was done by ensuring that policy engagement is an explicit criteria in calls for proposals, policy actors have been embedded in project steering committees and advisory committees, and that projects engage policy-practitioners in activities and training at the

local level. A good example of this would be where projects involve line agency staff in the research process, for instance through participation in surveys and capacity building activities. Several of our project partners, including ISET-Nepal (106034) and SPDC (106857), have secured grants through IDRC's Think Tank Initiative, towards improving their organizational capacity to influence public policy debates.

Overall, our experience in the CCW program validates what is already well known in research to policy circles: that policy change takes place through temporary opportunities and windows that are difficult to anticipate/predict, and which are very fluid depending on external factors such as disasters, political shifts, and influences relating to the global economy (Carden, 2009).

Story 4: Our program has helped meet the demand for practical solutions

Broad categories of tangible products produced by CCW grantees include: GIS databases on natural resource availability and vulnerability;[15] technologies including ICTs;[16] and adaptation and/or risk management plans.[17] Across our portfolio, we have found that ***research is better able to provide products and/or technologies that deliver impact when we insist on the development of practical solutions that meet the needs of decision-makers***.

Integrating findings into policy through consultation

By far, the most common role that CCW researchers played in influencing policy has been through consultation by direct request from government. Researchers are seen as important sources of information that can inform better policy development. In numerous cases, partners have been invited to lead/champion policy change with relevant government ministries. For example, the research team looking at adaptation in agriculture and water resources in the Greater Horn of Africa (106552) was very effective at working collaboratively with government authorities – the Kenyan portion of the team was directly involved in the development of the National Climate Change Action Plan.[18] Also, the research teams at Development Workshop in Angola (105673) and Jagori in Delhi (105524) were consulted on draft policies with regard to urban vulnerability.

In Argentina, Esteban Jobbagi from CONICET and the *Universidad de San Luis* (106601) was consulted by the state government of San Luis as well as the national government on hydrological changes associated with climate and land use change. Still other work is being used by influential research-to-policy brokers as a basis to strengthen the inclusion of developing country led research into international policy processes. The clearest illustration of this are the numbers of grantees engaged in the Fifth IPCC Assessment Report, which include researchers from IGP, UWI, Sokoine University, University of Cape Town, *Fundación Bariloche*, Lahore University of Management Sciences, University of Alexandria, and the *Pontificia Universidad Católica de Chile*. In all, 24 grantees from the CCW network are central to the IPCC process (see Annex 10).

[15] The following projects have incorporated the use of GIS and/or databases on natural resources and on vulnerability: 104396, 104397, 104783, 104899, 105567, 105673, 105719, 106551, 106703, and 107097.
[16] The following projects incorporated technologies/systems/structures: 105191, 106549, 106591, 106594, 106703, and 107087.
[17] The following projects were involved in the development of adaptation or risk management plans for negotiation or used directly for planning at a range of levels: 104397, 104554, 105185, 105191, 105410, 105515, 105567, 105674, 105838, 106034, 106248, 106552 and 106703.
[18] The other country teams were also successful in collaborating with government authorities. The Tanzanian team was invited to be a key advisor to the Ministry of Agriculture, Food Security, and Cooperative, and is involved in the development of the Agricultural Sector Climate Change Strategic Interventions and Action Plan. The Sudanese team was to consult on the development of a proposal for a $5.7M project submitted to Global Environment Facility (GEF).

Policymakers appreciate simple, actionable messages. Some of the researchers that CCW has supported have developed a scientifically based protocol to understand the "limits of acceptable change" in an ecosystem. Essentially, this is a consensus on what are the thresholds for an ecological system that cannot be surpassed without serious consequences. This clear concept has traction for decision-makers and helps highlight priority actions required to help a given ecosystem to adapt. Such an approach allows existing data to be productively used to influence management level decision-making. For example, a baseline assessment of the ecological character of India's Chilika lagoon was completed by Wetlands International (106703), which led to the development of a management plan and policy launched by the Chief Minister of the State of Odisha in 2013, discussed in more detail in Story 5 (read more about this project).

In another case, a CCW supported project has actually finalized a new policy whose development can be attributed in large measure to IDRC funding. This project team formed the knowledge basis for the drafting of an "Integrated Coastal Management policy" that identifies at risk low-lying slums in Cape Town and identifies adaptation strategies (105674). In Angola, the research team at Development Workshop (DW) (105673) tested a model of community water management with the Ministry of Water and Energy, which was adopted as national policy in February 2014. The African Development Bank, Angolan Government, and the Canadian company CoWater have now engaged DW to design the 10 year national water strategy for 2015-2025 (read more about this project).

Some governments have referred to experience of our grantees to scale up studied technologies. Five projects highlighted by an external evaluation of the CCW coastal portfolio have resulted in interventions to reduce risks which were infrastructural and/or policy-oriented (Jobbins, 2014). Four of these five projects were successful in their efforts: 105515 (Nile Delta), for inserting its work on sea-level rise risk into Egypt's draft national strategy on adaptation and disaster risk reduction; 105674 (Cape Town), both for physical slum upgrading and for policy and institutional progress in the City of Cape Town, including new coastal set-back policy; 105868 (Five-City Network), for various city-led field interventions, policy changes, and the two mayoral declarations, which are now influencing other cities beyond the original five; and 105814 (Accra), for some storm drainage improvements to reduce flood risk. The CCAA/CCW project in Cape Verde (105838), however, struggled to have an impact when invited to contribute to two policies on land management in the country, partly due to the limits of its research capacity. Similarly, the UPE/CCW project with the American University of Beirut (106706) was unable to capitalize on its outstanding research credentials to develop a planned Sustainable Urban Development Framework. The team had underestimated the challenge of their task, in that they overestimated the Municipal Councils' interest (Tripoli was also struggling with sectarian violence at the time).

Practical solutions at the local level

In terms of the uptake of project results, most CCW-supported work has focused at the local level. Those projects that had tangible and practical products to offer decision-makers and influencers tended to be more successful in influencing their audience. For instance, findings from a project led by the *Institut International d'Ingénierie de l'Eau et de l'Environnement* (2iE) (106549) has convinced the government of Burkina Faso of the importance of providing farmers with a low-cost irrigation option to cope with drought. Through the Ministry of Water and Agriculture, the government began promoting a countrywide initiative on rainwater harvesting, with a cash-for-work program aiming to build 10,000 water collection basins by the end of 2013. To date, over 4000 basins have already been built. Preliminary findings also show a clear increase in yield of up to 30% for sorghum and maize in all plots using the water from the basins.

Moreover, “no-regrets” options – essentially investments that meet both short-term needs and were also adaptive – tended to attract a lot of interest. In the Altiplano region of Bolivia, climate change requires local action for more efficient use of water resources. The project led by *Universidad Mayor de San Andres* and *Agua Sustentable* (104554) has modeled the future climate and hydrology of the Sajhuaya River Basin in La Paz province, and using this analysis and discussions with 1600 residents, has developed the first published local adaptation plan for the basin,[19] which also serves as a model for adaptation plans in other parts of the country[20]. This plan considers engineering aspects and capital costs for five very simple irrigation systems appropriate to the basin. Further, the project was able to provide effective training to communities on integrated pest management, water conservation practices (e.g. use of mulches, drip irrigation, and water storage), as well as planting and managing fruit tree and flower species. Formal alliances have been established with institutions involved in water regulation and management, including the region's association of local water providers. The team is now focused on scaling up the use of the pilot water systems (Agua Sustentable, 2013) (read more about this project).

To help bridge our partners with adaptation planning at the local level, we presented our work at the ICLEI Resilient Cities Congress in 2013 and again in 2014 (read more about this project). This engagement resulted in an invitation for CCW partners to contribute to the development of the Urban Climate Change Research Network’s (UCCRN) 2nd Assessment Report on Cities and Climate Change (107562). The ARC2-3, as it is known, is designed to provide policy guidance to governments tasked with climate change planning at the municipal level. Eight CCW-supported researchers are now authors or lead authors of the report, which includes contributions from more than 50 of the world’s top scientists in urban research (see Annex 10). The report is also used by the IPCC and, more importantly, by city authorities as a resource on improved adaptation planning. The engagement of CCW partners in this process was intentional by the program and we succeeded through (1) financial support for the ARC3-2 authors meeting in New York in the fall of 2013, (2) use of IDRC projects as case studies, and (3) networking of IDRC project leaders with chapter working groups set up by the UCCRN.

The above project examples highlight the broad range of practical tools and adaptation interventions that were used and produced by our grantees. As we have seen, there have been many situations where grantees were directly approached by governments at different levels to provide expertise and input into policy processes. In most cases, these interventions were successful, largely due to the focus on developing practical solutions that respond to demand and involve engagement with decision-makers.

Story 5: By insisting on stakeholder engagement, we have achieved more success in the uptake of solutions

Researchers often struggle to convey key messages clearly. Partly due to this, many potential research users do not immediately grasp the use value of some research. In our program, we observed a clear link between outputs and impact in the policy environment when they are relevant to a range of research users, from influential individuals and communities, to local and national governments, to private sector actors. Therefore, we conclude that **researchers need to continuously work with user groups across a broad spectrum in order to maximize the probability of long-term positive impacts**. Some examples from our portfolio highlight the value of this approach.

[19] See Local adaptation plan for the Illimani Watershed.
[20] For instance, the team also helped to prepare a similar adaptation plan for Sajama National Park in the Bolivian Department of Oruro.

The research team from Chiang Mai and Meajo Universities (107087) are working with cage and pond tilapia farmers in Northern Thailand to develop climate smart aquaculture strategies. In 2009, the statistics of the Department of Fisheries valued production from aquaculture in northern Thailand at around $160 million USD, excluding other economic activities that form part of the value chain. While the tilapia-dominated aquaculture of the region is economically very important, increasingly frequent water shortages are severely impacting both fisheries and agriculture. This has created an environment in which information on aquaculture and climate change is in high demand. The team is well placed to provide this information, as they have significant academic credibility and political independence, and, most importantly, experience in fisheries health. Despite this, they have a very humble approach and recognise clearly that the farmers themselves are the best reservoirs of knowledge of the system. Acknowledging this, the research team has engaged the fish farmers (as "citizen scientists") and staff from the local Department of Fisheries and the Royal Irrigation Department in the research team. This has enabled them to develop very strong working relationships across a range of stakeholders in the public and private sectors (read more about this project).

Wetlands International (106703) has also been successful in engaging with a range of stakeholders. The research team is fully integrated with the Chilika Development Authority (CDA) and has been since the establishment of this State Authority responsible for the Chilika Lagoon. In fact, the first Head of the Authority was a previous lead from Wetlands International and the two organizations refer to themselves collectively as "we". An Integrated Management Planning Framework for Conservation and Wise Use was produced jointly under this project. The success of this relationship has also benefited the credibility of Wetlands International and CDA nationally. Since its completion, a number of large wetland areas in India have since requested assistance from both institutions to produce similar frameworks for their own sites/areas. In December 2013, they organized a meeting of State Ministers on wetland management and climate change at the request of the Ministry of Environment, demonstrating the respect they have gained at the State and National level, largely as a result of this work. Equally important, village and community level activities have been implemented through well-established local NGOs, serving the 200,000 fishers and 400,000 farmers living around the lagoon (read more about this project).

A project that worked with Accra and Addis Ababa on their "urbanizing watersheds" (106548) noted an important point that the development of clean strategies and plans is an important step, but implementation is where failure is common. In addition to biophysical analysis, the team researched behaviour change through an ongoing engagement process with the city authorities. The result in both cities were clearly articulated municipal action agendas that had the buy-in of local authorities. It is worth noting that the technical expertise of the project team to conduct strong bio-physical science was central to building trust. As a result of this work, the Accra Metropolitan Assembly paid for their staff to be trained on municipal policy and adaptation by the project team (read more about this project).

Five other successful projects that involved participatory outreach, multi-stakeholder workshops, and direct engagement of community members in research are presented in an evaluation of our coastal portfolio (Jobbins, 2013). These include: 105674, working with informal settlement communities in Cape Town; 106548, working with one study community in Accra; 106597, working with the various estuary communities in Argentina and Uruguay; 106706, working with communities in three field sites of Lebanon; and 106711, working with caboclos communities in the Amazon estuary. A final example is the CCW-supported project in Santiago de Chile (107081), where the team built alliances with important private sector water users, such as Coca-Cola, Anglo American, and Aguas Andinas, which led to

confidence building with the Santiago Metropolitan authorities. In May 2014, the City of Santiago signed on to the Durban Adaptation Charter, an international commitment to act on climate change.

Challenges to 'influencing' policy and practice

Engagement is not without challenges. One example of how engagement can backfire is the case of Moreno on the outskirts of Buenos Aires (103554), in a project led by IIED. At the end of the project, the representatives of the local government of Moreno expressed their deep displeasure at the involvement of community groups and researchers in policy initiatives, which they considered were a matter of their exclusive responsibility. This highlights the limits of the approach, especially when actors are perceived to have a bias and where trust is not well built. This outcome, however, was an isolated incident in our portfolio. The reviews of Project Completion Reports that we prepared include illustrative lessons of common challenges in how research would or would not be able to influence policy and practice. Below are some of the main lessons:

- Changes in governments delayed research influence on policies (105567 and 104397);
- Institutional barriers were not overcome within the lifetime of the project (105839);
- Rapid turnover of employees and limited capacity of municipal governments to draft bills and bylaws prevented adaptation strategies adopted by communities from being turned into legal instruments (105839);
- Policy setbacks resulting from violent unrest and the removal of civil and political services (104396); and
- Demands of elections limit the ability of governments to institute adaptation policies (106591).

In the climate change sphere, influence is further complicated by the fact that climate change has so many uncertainties associated with future scenarios that clear policy direction is difficult to achieve. In fact, as one CCW-supported researcher puts it: "confronted with uncertainty, it is better to know that you don't know, than to assume that you do when you don't (or cannot) know. It is possible to plan for uncertainty (Cartwright, 2013b)."[21] Partly due to this, the sum of the work that CCW has supported on adaptation suggests that flexible "no-regrets" options that are grounded in local knowledge and experience is the best possible starting point for adaptation.

A final point relates to the long-time scales required to truly influence policy. A portion of CCW's portfolio includes projects that were inherited from UPE that had started in the early 2000s associated with wastewater use. This was done in partnership with the International Water Management Institute (IWMI) (101537). A cluster of projects evolved from site specific work in Jordan, India, and several countries in Africa, and resulted in collaboration with the World Health Organization on testing the utility of the Guidelines for the safe use of wastewater, excreta, and grey water (published in 2006). This particular collaboration between IDRC and IWMI was acknowledged as one of the top 10 contributions IWMI has made to global water security in the past 25 years.[22] The main point here is that a ten-year cycle of work, with a dozen institutional partners, was required to take field research through to international influence.

[21] This point was extensively debated in the Coastal Synthesis Workshop held in Belem 2013 (107437), that uncertainty inherent to the climate sciences provides a fundamental challenge to developing longer-term policy for climate change adaptation.
[22] See list of IWMI's top ten achievements.

Section 3: Lessons and conclusions

Program impacts

In 2010, the CCW team agreed that three areas of impact are central to our program: improving access to water, managing risk and surprises, and affecting policy change. After four years of applied research and over $65M in investment, can we say that we have actually had an impact in these areas? We believe we have. The five program-level outcome stories that we presented in this report are indicative of some of the ways our program has succeeded, with reference to the many project-level contributions made by our grantees. Given the scope and scale of investments being made in the name of "adaptation", the conclusions of our program outlined below should affect how we position future research programming with the aim of making development investments more effective.

Has the CCW program helped to improve people's access to water?

In a number of cases, we have seen significant positive change. The work on safe wastewater use led by IWMI (105869) is one such example, but this success was the product of a decade of support. There are a number of notable examples of real and sustained impact on water resource availability and management, including work on irrigation in the Indian Punjab (106591), on municipal water management and governance in Addis Ababa and Accra (105869) and in Santiago (107081), as well as in countries such as Bolivia (104554), Colombia (106344), Peru (105567), and Tunisia (104396) where specific options to improve water availability have been proposed and tested.

Many CCW supported projects helped to lay the groundwork for important advances that would provide better access to water for the poor, such as in Chile (107081), Kenya (106664), and Tanzania (106552). In some cases, our partners have been doing research that is directly leading to change. Examples include the research led by Wetlands International in India's Chilika Lagoon (106703), by Consejo Nacional de Investigaciones Científicas y Técnicas in the Chaco region of Argentina and Paraguay (106601), and in a number of city-regions where our grantees are active. These latter projects are being considered for reinforcement through supplements and/or second phases to take results through to impact.

In some cases, projects have provided a strong analytical base, but have not yet been able to bring solutions to scale. For example, autonomous adaptation can be understood, however, applying local strategies to a larger scale and at a broader level is challenging, and may in fact not be appropriate or realistic. Our projects in Nepal (106034), Peru (105567), and Bolivia (104554) provide the strongest cases for scaling-up autonomous adaptations and finding ways to share this experience in a useful manner.

Has the CCW program been able to help manage risks and surprises?

The program helped to improve risk management in a number of ways: by improving vulnerability analysis; by developing, measuring, and testing risk-response systems; and getting traction with policy and practitioner audiences. Examples include identifying flood risks and working with local governments to identify ways of mitigating them in the Philippines (106326-02), Dakar (107026), and Cape Town (105674); developing early warning systems in India (106703), the Philippines (106326-02), and Benin (106547); and improving ways of communicating risk in Cambodia (107088), Vietnam (106707), and Uganda (106594). Overall, management of risk is central to adaptation. Moreover, it is cost effective and attractive to decision-makers.

Complex systems such as the Nile Delta in Egypt are more challenging places in which to have an impact. Our partners at the University of Alexandria (106551) have produced important new knowledge on climate impacts in the Delta, yet uptake into policy is extremely challenging due to limitations of governance and current political battles. Moreover, the long time horizon associated with sea level rise, the main climate threat in the Delta, affects the willingness of many stakeholders to act on scientific findings (Abdrabo, 2013).

Did the CCW program improve public policy debates and related decision-making?

Many of our partners have built good working relationships with decision-makers that will enable them to have influence in the future. In several cases, such as in Angola (107025), Chile (107081), and India (106703), we can point to specific commitments made by governments to follow through on implementing solutions and approaches proposed by our grantees. Our support has emphasized the demand side of research – ensuring that results are relevant and respond to known problems. Informing adaptation policy is a long-term investment, but as the above three cases illustrate, researchers committed to long-term relationship building can have an impact.

There remains an inherent uncertainty in expressing climate futures, which is neither easily expressed by researchers, nor understood by decision-makers. This can divert the policy development process since the time scale of the problem, and the range of probable climate scenarios is very large. We are working to improve the situation across our portfolio with a new program-wide initiative that bridges the information gap between climate scientists and practitioners (107682). We agree with Cardin (2009) who states that "influence is more process than product, moreover, is a means of activities and relationships interacting with each other." In a significant part of our portfolio, the development of trust between researchers and end users has established a much more enabling environment, partly as a result of proactive involvement and intention on the part of the CCW program.

In concert with the IDRC 2010-2015 Strategic Framework, the CCW program emphasized the importance of researchers' responsibility to communicate impact at an appropriate and realistic level. Where they have struggled to do so, we provided support to address their individual needs. We have also identified challenges at the regional level, which are being addressing through activities such as the upcoming workshop on "Communicating Research for Policy Influence: Climate Change and Water in Africa" in Pretoria, South Africa in September 2014. This workshop will bring together our partners in Africa to build their dissemination efforts (107815).

Lessons learned

There are no easy solutions: The importance of uncertainty

A review of our portfolio (mostly contained in Project Approval Documents (PADs) and Project Completion Reports (PCRs)) reveals that a lot of attention was paid to identifying bottlenecks to adaptation. Large-scale impacts of climate change are increasingly well understood, but localized impacts are still characterized by uncertainty, which makes decisive action complicated. Coming to terms with decision making without perfect data is a cornerstone of adaptive policy that we are continuing to emphasize across the program (107682).

Adaptation: Moving from concept to action

Research is more effective when it is demand responsive and considers the needs expressed by municipal authorities, practitioners, and civil society, who require concrete tools to solve specific short- and medium-term problems. This was demonstrated in Story 4 (p.20). It also brings us back full-circle to the CCW Prospectus, which states that "adaptation research should emphasize the needs of policymakers to have practical and focused tools and [to understand] the broad scope of adaptation research at different scales – both physical and temporal (p.9)". Our funding model and strategy focused on engagement with research users to build trust and effective partnerships that led to positive change, as illustrated in Story 5 (p.22). The "clustering" approach of grouping projects by theme helped to identify the optimal networks of research users that we could work with, and allowed our grantees to better position their work for influence.

Have "no regrets" and avoid the cost of inaction

As the program's work has shown, risks and vulnerability are increasingly well understood, but the cost of inaction is not yet defined to the point where decision-makers are willing to make a concerted effort to invest in adaptation. Through this process, we have concluded that the following challenges remain:

- Capturing autonomous adaptation in economic models;
- Monetizing adaptation options (benefits are difficult to estimate);
- Uncertainty over specific impacts of climate change on the water sector;
- Challenges in distinguishing between broader development and specific climate change adaptation measures in economic models;
- Lack of consensus on what constitutes adaptive capacity; and
- Lack of mechanisms within municipal budgets to support adaptation.

In spite of these challenges, we have been able to support the testing of "no regret" adaptation options identified by our grantees[23]. Adaptation strategies in the water sector emphasize water conservation (e.g. irrigation efficiency and use of water reservoirs), finding new sources of water, and improving existing infrastructure and management capability. Across our portfolio, dozens of strategies have been tested, which are now being organized into a catalogue for ease of access and reference through a grant with ICLEI-Canada and the University of Waterloo (107599). These (tangible research outputs are important for impact – many constitute good development practice, while also demonstrating increased adaptive capacity, and are clearly 'net benefit' projects.

Build the capacity to influence

The CCW program has made a significant contribution to strengthening capacity of researchers to conduct interdisciplinary research. We have employed a number of effective mechanisms including mentoring, connecting junior and senior researchers, providing flexible funding arrangements, and promoting peer assistance (see Annex 6). The grants+ modality[24] remains key to building the capacity of research teams, and addressing gaps in project lifecycles and between groups of partners. It also capitalizes on the strength of CCW's networks to build and strengthen communities of practice. Our communications efforts were also important in helping our partners (and ourselves) to refine messaging

[23] "No regrets" is a widely used term that emphasizes actions where there is a low likelihood of a negative outcome even in the event of more extreme climate change (for example, rainwater harvesting). Many international actors, such as the Global Water Partnership, now accept that this is probably the best way for adaptation to occur.

[24] "Grants +" is the term used by IDRC to express the one on one mentorship offered to researchers by IDRC staff, which helps build technical and administrative capacity. It is a cornerstone of the IDRC 2010-2015 Strategic Framework.

and clearly articulate research value and application. Also important are the successful examples where CCW funding has led to even further investment for grantees from other donors, since it provides external validation of the work we are supporting (see Box 1).

CCW staff are brokers that help to amplify research results

In line with the IDRC approach to research support, CCW staff are directly engaged in helping partners focus their research and advocacy plans. Increasingly, this role extends to more proactive engagement with partners in the Canadian government, with whom we work collaboratively. For example, the rapid growth of interest in adaptation (and mitigation) associated with cities was seen by the team as a chance to highlight our existing portfolio on the topic.

Through our association with Fast Start Climate Finance, we developed strong relationships with Environment Canada and the Department of Foreign Affairs, Trade, and Development (DFATD). This relationship has also involved engagement with government ministers. For example, the Hon. Peter Kent (former Minister of the Environment) helped launch the Fast Start funded African Adaptation Research Centres (AARC) initiative on Nov. 25th, 2013. The current Minister of the Environment, the Hon. Leona Aglukkaq, highlighted examples of IDRC's work on climate change adaptation in her intervention at the High-level Ministerial Dialogue on Climate Finance at COP19 in Warsaw[25]. Furthermore, a recent interview between CBC's Evan Solomon and Peter Braid, a Member of Parliament, draws attention to the Fast Start portfolio and the importance of climate change research. We believe that through this partnership with the Government of Canada, CCW has contributed to support government objectives, which in turn had a positive effect on our reputation. Our engagement included:

- Briefing climate change negotiators in the government on what we were learning (i.e. meeting with Guy Saint-Jacques, former Chief Negotiator and Ambassador for Climate Change at Environment Canada, in advance of COP17 in Durban);
- Providing commentary on the Climate Technology Initiative managed by Natural Resources Canada;
- Consistently sharing progress updates to Environment Canada on IDRC's Fast Start funded projects;
- Sharing input with DFATD on trade policy and the potential for adaptation to be incorporated into export credits; and
- Contributing to the Plan of Action to Implement the Joint Declaration on ASEAN-Canada Enhanced Partnership.

Future directions

Four years into the CCW program, and a decade after IDRC initially started its work on adaptation, the Centre has built momentum in this field. Many of the projects in the CCW portfolio are ongoing, and will continue to generate relevant results well into 2015. In the near term, CCW will:

- Complete our remaining synthesis activities on bridging the modeling to policy information gap (107682) and the economics of adaptation and climate-resilient development (107593);
- Deliver a research to policy workshop for our African grantees in September, 2014 (107815);
- Finalize program and partner contributions to the UCCRN's ARC3-2 report, which will be launched in advance of COP21 in Paris (107562);

[25] The reference to IDRC's work on climate change adaptation occurs at approximately 2:20:10 in the webcast.

- Prepare a special issue of the journal *Water International*;
- Present our grantees and their work at the World Water Congress in May, 2015 (107750).

In addition, approximately 40 of our currently active projects will end within the next two to three years. New initiatives planned include second phases for high performing Fast Start funded projects (which is being encouraged by Environment Canada and DFATD), a focus on city-regions and territories where water issues are critical, and initiating new work to bridge adaptation projects with private sector interests. New investments that build on the successes of the Fast Start projects is an obvious next step in our work. Meanwhile, CCW is focusing on two additional themes, described below, that we believe are challenging and high impact areas of work with the potential to be developed in partnership with another funder.

Finance for adaptation

With an expected increase in global climate finance (e.g. the Green Climate Fund), there is a growing need for clear investment proposals for adaptation. Much of this funding has yet to be allocated and clear options for investment in the water sector are required. We also know that the climate change adaptation community is struggling to engage the private sector. As one of our grantees made clear, while there are many funds available for adaptation, development banks are simply "not finding any good projects that make a compelling investment proposition." The CCW report on Assessing Barriers and Solutions to Adaptation Funding in Africa (106922) corroborates this.

Many of our projects have had extensive private sector engagement, for example with the agricultural industry in the Indian Punjab (106591) and the Chaco Region (106601), and with the mining sector and private utilities in Chile (107081). However, there is little evidence of any interest from the private sector to invest in adaptation. In response, CCW is collaborating with the Development Bank of Southern Africa, NRCan, and the Private Finance Advisory Network to look at business cases and models for how to bridge adaptation projects – few of which would qualify as sustainable financial propositions – with private equity (107351), to develop a model that would bridge adaptation projects with private finance. The model will be tested with private industry in an attempt to scale the amount of resources available for adaptation in Africa. A rich research agenda exists moving forward, considering issues around scalability of solutions, the urgent need for additional investment in adaptation, and the expertise that the private sector can bring to business planning and communication.

City regions

Another area that we consider critical for our program in the near term is reconciling urban growth with the impacts of climate change. Our work in Bangalore (107086), Santiago (107081), Dakar (107026), Alexandria (106551), and Cape Town (105674), has shown the importance of research in providing water utilities and managers with the right kinds of data to make better decisions for the poor and for local industry in the short and long term. One of our grantees in South Asia, SaciWATERs (106248), highlighted the fundamental vulnerability and importance of peri-urban areas in the water-climate debate. It is also clear that sustainable economic development and food security for hundreds of millions of people cannot be achieved without adequately managing demands on water in and around cities. A significant impact could be made on communities globally through a research agenda that tackles upstream modeling to understand downstream risks, flood, and preparedness; urban/peri-urban governance; and alternative options for water supply and sanitation (read more about CCW's urban research).

From ideas to impact: Prospects for the future

The approaches described above are some of the high value areas where CCW is poised to make a contribution. Both are important focal points where research can lead to profound impact, and are areas where other institutions and funders are struggling. When the CCW program began in 2010, adaptation was still an esoteric concept. Today, we are seeing that it is increasingly understood amongst different stakeholder circles, including decision-makers who have the power to influence change and communities that ultimately suffer most from impacts of climate change. The perception we have – one that is validated by many of the actors we engage with – is that in four years, IDRC has rapidly become an important player in the field of adaptation research in the water sector. Our grantees are seen as not only experts in analysis and research, but as thought leaders who drive adaptation forward. This momentum is further fueled through the increasing demands our grantees are receiving from governments, private sector, and civil society to help develop and implement solutions. We believe there is ample ground on which to develop new programming that delivers impact at scale, by building on what we have done well, and which propels our goal to safeguard water availability and quality for vulnerable people in the face of climate change.

Illimani Mountain, Bolivia.

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Annex 2. CCW's Theory of Change

CCW Outcomes[1]	Assumptions	Strategy (what CCW controls)	So that… (CCW's direct influence)	Intermediate Outcome (CCWs indirect influence)	Development Outcomes (externally mediated influence)
Outcome 1: High-quality, context-specific, applied research on water related impacts of climate change.	High-quality, peer-reviewed, research is needed to influence policies, plans, and actions. CCW is helping to set the agenda for research and help build the field.	• Funding and technical assistance to researchers in order to do high quality research (peer reviewed) that is strategically disseminated to a wide audience. • Explorations and other "high risk" programming on emergent topics.	…researchers and research users have a better understanding of changes in climate, bottlenecks to adaptations, probable impacts, vulnerability and solutions.	A set of researchers supported by CCW is able to articulate solutions and responses that are useful to decision makers responsible for climate/water planning and in some cases, those affected directly by climate change.	1) Improvements in the quality and availability of water for the poor. 2) Better management of risks and surprises and enhanced preparedness to deal with climate change impacts. 3) Sharpening debates and decision making that leads to adaptation. 4) Improved capacity of communities to adapt to changes in climate.
Outcome 2: capacity built amongst CCW researchers and students to conduct interdisciplinary research, and use appropriate methods.	Interdisciplinary research is needed to strengthen adaptation policies, plans, and actions.	• Formal training. • Funding awards programs. • Offering informal mentoring. through the grants + approach • Focus on a subset of methods (especially economics).	…a larger cohort of researchers are able to jointly analyze problems and find solutions to pressing water/climate challenge.		
Outcome 3: Research is being communicated to, and used by policy developers, communities and parts of the private sector; researchers are working closely with policy makers; Southern led networks are emerging.	Better coordination between institutions, early engagement with policy makers, and the facilitation of improved networks and partnerships will improve policy, plans, and actions for adaptation to climate change.	• Ensuring research is demand driven. • Support for researchers to attend strategic meetings/workshops and networking. • Training on strategic communications. • Synthesis activities. • Partnerships with key organisations (e.g. Environment Canada, UCCRN, IPCC, etc.).	…researchers are demand responsive, and knowledge generated on practical solutions is being used by decision makers and investors.		

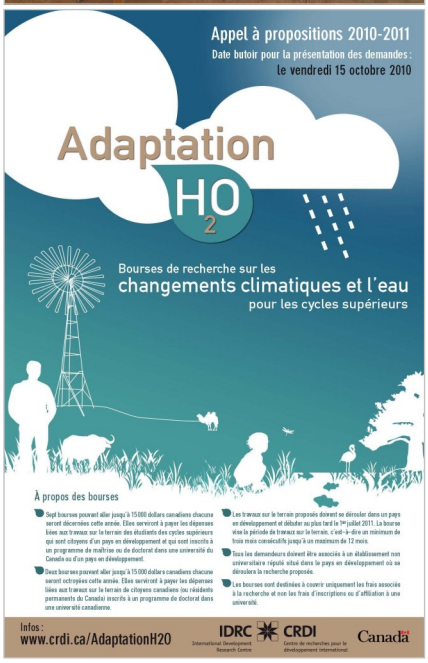
[1] *NB: this is a distillation of the projected outcomes of CCW from our prospectus table 1, p. 10*

Climate Change and Water Program Timeline

2010


1


2



Jul Call for proposals: Adaptation H2O Awards Program (106299)

Oct Call for proposals: Adapting to Climate Change in Vulnerable Coastal Communities in LAC and Asia

Oct Call for proposals: African Adaptation Research Centres (AARC) initiative (Fast Start I)

Nov Grantees at Water, Climate Change, Innovation, and Natural Disasters: Impacts and Prospects for the Bio Bio Chile Region (106371) workshop

2011

3


4


5


6

Jun Inaugural workshop of the AARC initiative (106667) in Accra

Jul Call for proposals #2: Adaptation H2O Awards Program (106299)

Jul Exploration workshop: ICTs, climate change, and water (106395) in Johannesburg

Aug Grantees host Levers of Change in (Peri) Urban Water Management seminar at World Water Week in Stockholm

Sep Grantees at XIV World Water Congress (106148) in Porto de Galinhas

Sep Exploration workshop: Energy, climate change and water (106298) in Porto de Galinhas

Nov Call for proposals: Adaptation Research Initiatives in Asia and the Americas (Fast Start II)

Nov AfricaInteract research to policy platform (106533) launched at COP17 in Durban

Nov Public launch of AARC Initiative (Fast Start I) with Canada's Minister of Environment, Hon. Peter Kent

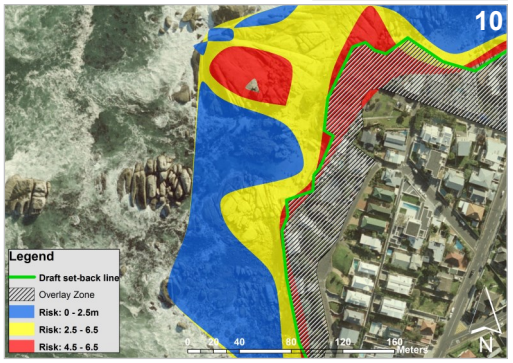
Dec IDRC grantees at 2nd Lead Authors Meeting for IPCC WGII contribution to the 5th Assessment Report (AR5)

2012


7


8


9



10

Jan Call for proposals #2: African Climate Change Fellowship Programme - Phase 2 (106391) [Final report]

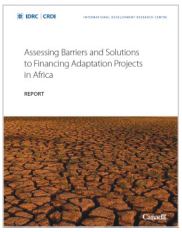
Jul Call for proposals: ICTs, Climate Change, and Water Awards Program (106855)

Jul First International Climate Change and Population Conference in Accra hosted by University of Ghana (106548)

Aug Grantees at World Water Week in Stockholm

Sep Workshop: Economic Analysis of Adaptation Options to Climate Change (106980) for AARC researchers

2013



Mar Call for proposals: South Asian Water Fellowship (SAWA) Program (107240)

Mar Launch of Adaptation Research Initiatives in Asia and the Americas (Fast Start II)

Apr Grantees participate at 7th Community-Based Adaptation Conference in Dhaka (107276)

May Grantees at Resilient Cities 2013 (107040) (CCW's synthesis of urban/peri-urban research)

Jun Synthesis workshop: Adapting to Climate Change and Water Security in Asia (106248) in Kathmandu [Final report]

Sep Grantees at the Urban Climate Change Research Network's Initiating workshop for the 2nd Assessment Report on Climate Change and Cities (107562) in NYC

Oct Synthesis workshop: Adaptation Research in Coastal and Delta Areas (107437) in Belem do Pará [Final report]

Oct Grantees at Africa Climate Conference in Arusha

Nov Launch of Assessing Barriers and Solutions to Financing Adaptation Projects and in Africa report (106922)

Dec Synthesis workshop: Climate Change in the Water Sector: How Can Research Best Meet the Needs of Decision-makers? for LAC Fast Start grantees (107283) in Panama [Final report]

2014

Mar Call for proposals: External evaluation of CCW portfolio on coastal adaptation (107437) [Final report]

Mar Launch of In Conversation video series

May CCW panel at Harvard's Design for Urban Disasters Conference

May Grantees at Resilient Cities 2014 in Bonn (107703)

Jun Grantees participate in How (well) are we adapting to the water-related impacts of climate change? workshop in Waterloo

Jun Launch of Climate change and water adaptation options (107599) project in Waterloo

Jun IDRC at UNFCCC Standing Committee on Finance meeting in Montego Bay, Jamaica

Sep Grantees at Deltas in Times of Climate Change conference in Rotterdam

Sep Grantees at Midterm Workshop for Authors of 2nd Assessment Report on Climate Change and Cities, hosted by Siemens in London

Sep Workshop on communicating research for policy influence in Pretoria for grantees in Africa (107815)

Oct Synthesis workshop: Integrated climate change modelling and policy linkages for adaptive planning (107682) in Cape Town

Nov Grantees at Socio-economic risk management tools of water resources for climate change adaptation in LAC workshop with ECLAC in Santiago (107804)

2015

Feb Dissemination workshop for CCW's work in Pakistan (105857)

May Grantees at IWRA World Water Congress XV in Edinburgh (107750)

April Adaptation H2O award recipients participate at the 9th Community Based Adaptation Conference (106299) in Nairobi, Kenya

Jul Grantees at Our Common Future under Climate Change international scientific conference in Paris, France

1 Grantees are helping *Caboclos* communities in the Amazon adapt to changing tides and frequent floods (106711) **2** Project 106549 in Burkina Faso helped construct over 4000 basins in farming communities as a low-cost irrigation option to cope with drought **3** Hon. Peter Kent joins IDRC in the launch of the Fast Start AARC initiative (Nov. 2011) **4** Grantees at the XIV World Water Congress **5** Partners exchange ideas at the AARC workshop in Accra (Jun. 2011) **6** Grantees worked closely with communities in the Illimani watershed to develop Bolivia's first local adaptation plan (104554) **7** Grantees are assessing Thailand's Flood Management Master Plan and providing recommendations for improved governance and response to extreme floods (107094) **8** Researchers identified vulnerable "hot spots" in South Africa by combining crop forecasts and climate models with results from a "human vulnerability index" **9** The use of tensiometers to assess soil moisture on farms in the Indian Punjab (106591) led to water savings of more than 30% **10** Findings from the Cape Town project (105674) helped implement a set-back line to prohibit new development in high-risk flood areas **11** Fast Start partners in LAC engage with decision-makers at the Panama synthesis workshop (Dec. 2013) **12** Research in India's Chilika Lagoon (106703) led to the development of a planning framework to preserve ecosystem services and sustain livelihoods **13** The *In Conversation* videos were launched on IDRC's YouTube channel (Mar. 2014) **14** Research in Pakistan (106857) is uncovering farmers' perceptions of climate change and identifying adaptation options for food security

Annex 4. CCW Graduated Outcome Areas

Outcome Area	Baseline	Expected outcomes		
		Minimum impact	Medium impact	High impact
Outcome Area 1	Research on climate change and water is disparate and largely driven by institutions in developed countries, although some good work in developing countries is starting to emerge, particularly in Asia. Much research does not have a positive impact on communities.	Research projects supported by CCW are able to improve the quality and availability of water for the poor, reduce risk, and/or affect change in policy in the face of climate change. Strategies to build capacity to adapt to such change are tested and understood. Bottlenecks in the uptake of existing technical and managerial options are identified.	Partners are able to secure other sources of funding for their research. Research projects are growing in prominence and more people are positively affected by the applied work. A measurable change in adaptive capacity is noted in several communities or institutions.	Improvements in capacity to adapt to climate change and a reduction in vulnerability to water stress at multiple scales — from small communities to larger sub-regions containing a large population — are documented.
Outcome Area 2	The capacity of many researchers to conduct vulnerability, social, gender, and economic analysis in the field of climate change and water resources is weak. The potential for a multidisciplinary approach to contribute to climate change adaptation has not been realized.	The capacity of a number of researchers (minimum 15) to use key or pivotal methods to conduct economic analysis and apply appropriate social research methods to improve water management linked to climate change and their ability to communicate research results are strengthened.	These methodological approaches are being readily applied in research and helping to reduce barriers to scaling up solutions to water stress.	Multidisciplinary approaches and methodological innovations in social analysis, water management, and economic analysis are being used by and influencing other research organizations and in some instances, policymakers.
Outcome Area 3	Policies and laws on water management tend to be supply focused and do not consider the likely impacts of climate change. Policies are not flexible and are difficult to modify based on the changing environmental scenario.	Research leads to validated policy options that are communicated to potential users. Feasible strategies to improve water security in changing climate conditions are made available. Researchers are working closely with policymakers as a matter of practice.	Several cases of national or municipal policy change are affected or informed by the program's research.	Improvements in access to water are evident as a result of CCW policies. These policies reflect the need to be adaptive/flexible in the face of climate change.

Annex 5. CCW Thematic Areas (March 2012)

CCW themes were initially articulated in the CCW Prospectus and were subsequently updated in 2011. In March 2012, it was decided that additional amendments were required to ensure that project categories were logical and accurately reflected the thematic scope of the program.

Thematic areas are used for monitoring and reporting on the scope of the CCW portfolio of projects as well as for making research results accessible to the public (e.g. through the IDL). A specific set of themes and exploratory areas are the main research foci of CCW funded projects. As compared with more established themes, exploratory areas are distinguished as incipient fields supported by CCW. Cross-cutting themes are key elements and methodologies prioritized by CCW and supported through CCW projects and research support projects (RSPs).

To more accurately reflect the scope of CCW's portfolio, the following amended list will now be used to classify CCW projects and RSPs:

Main themes

- **Coastal vulnerability** *(includes sea-level rise, saline intrusion, storm surges and coastal flooding, coastal protective infrastructure, etc.)*
- **Disaster risk reduction** (*includes flooding and flood management, drought, early warning systems, economics of DRR, social impacts of disasters and building resilience to recover from/withstand natural hazards, etc.)*
- **Urban and peri-urban water and sanitation** (*includes water supply, wastewater treatment and reuse in urban/peri-urban settings, etc*.)
- **Water and agriculture** (*includes agricultural productivity, water use, irrigation, food security, etc*.)
- **Mountain areas** (*includes glacial melt, watershed management in mountain areas)*
- **Water governance and management** (*includes watershed management, water demand management and pricing, water users' associations, conflict over water, etc.)*
- **Other** (*to categorize older projects whose focus is not aligned with one of CCW's main themes: i.e. housing, solid waste management, etc.)*

Exploratory areas

- **Energy** (*renewable energy for water services in regions under climatic stress, water and energy as competing resources*)
- **Information and communication technologies (ICTs)**

Cross-cutting themes

- **Gender** *(use of gender analysis, focus on gender dimensions of vulnerability and adaptation options)*
- **Economics of climate change adaptation** *(including cost-benefit analysis, etc.)*
- **Modeling and decision-support tools**
- **Capacity building** *(including fellowships programs, training events, etc.)*
- **Knowledge sharing** *(including research into use/dissemination activities, outreach events, conferences and workshops, support for publications, etc.)*

Annex 6. Snapshot on Capacity Building

Capacity built through research projects

81% of the program´s 83 research projects (RP)[1] are led by institutions from the global South.[2]

Through participation in CCW research projects, at least **40** students have submitted graduate theses (32 MSc and 8 PhDs)[3]. **Another 126 students** are recipients of one of the fellowship programs supported by CCW (see below), or are involved in research projects but have not yet submitted theses at the time this report was written.

CCW support to workshops and international conferences

Over the last 4 years, CCW supported and convened **12 workshops** that gathered the participation of **360 research partners**[4]. The goals of these workshops varied, but can be largely categorized into one of two main groups:

i) Workshops that aimed to strengthen the capacity of research partners to use key methods and to effectively communicate research results to key stakeholders, and
ii) Workshops that aimed to promote peer exchange, review of grantees research methodologies and findings, and synthesis of knowledge.

Additionally, the program provided sponsorship support to **7 international conferences**[5]. In most cases, the funding was used to support the participation of CCW grantees at the events, in addition to providing some core funding towards the event.

Fellowship programs

As of June 2014, **126** fellows are pursuing advanced research through a CCW-funded scholarship program on adaptation to climate change.

- **20** Master´s Awardees through the SAWA South Asian Water Fellowship (107240)[6]
- **3** PhDs, **3** MSc, and **1** Post-Doc fellowships[7] through the MAPA project in Chile (107081)
- **5** junior awardees through the Strengthening Environmental Economics Capacity in Research on Climate Change Adaptation (106316) project, managed by LACEEP in LAC.
- **43** fellows, of three fellowship types: **20** Adaptation Science fellowships; **17** Adaptation Policy Fellowships; and **6** Adaptation teaching fellowships through the African Climate Change Fellowship Program (ACCFP) – Phase II (106391). See Final Technical Report.
- **14** PhD and **17** Master´s awardees through the Application of ICTs for Water Management under Changing Climatic Conditions: Research Awards Program (106855), led by the University of Nairobi.

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[1] 83 research projects (RP) as of March 31st 2014. See *Annex 11: List of research projects*.
[2] *Annex 11: List of research projects* for a complete list of institutions leading CCW projects.
[3] *Annex 11: List of research projects*.
[4] See *Annex 8: List of conferences and workshops supported by CCW*.
[5] See *Annex 8: List of workshops and conferences supported by CCW*.
[6] The program aims at 60 fellowships, of which 20 were granted in the first year.
[7] See the announcement of the fellowships in the project website.

- **12** PhD and **4** Master´s Awardees through the first two rounds of the Adaptation H_2O Awards Program (106299). A third call for proposals will be launched in August 2014, through which **6** new awards will be granted.
- **4** Awardees through the competition: *LAC Young Researcher Awards* to present climate change research findings at the 14th World Water Congress of the International Water Resources Association (IWRA) in Brazil, 2011.

Annex 7. CCW Synthesis Meetings

Meetings held in 2013

Resilient Cities Congress 2013	
Location	Bonn, Germany
Date	May 31 - June 2, 2013
Host Partner	Local Governments for Sustainability (ICLEI)
Description	Synthesis of CCW's urban and peri-urban portfolio (thematic focus).

Adapting to Climate Change and Water Security in Asia	
Location	Kathmandu, Nepal
Date	June 19-20, 2013
Host Partner	South Asia Consortium for Interdisciplinary Water Resources Studies (SaciWATERs)
Description	Synthesis of CCW's portfolio of projects in Asia (regional focus).
Key Outputs	Event website (includes presentations) Final Synthesis Report

Research on Adaptation to Climate Change in Coastal and Estuarine Systems	
Location	Belem do Para, Brazil
Dates	October 2-4, 2013
Host Partner	Universidad do Para
Description	Synthesis of CCW's portfolio of projects in coastal areas (thematic focus).
Key Outputs	Event website (includes presentations) Final Synthesis report

Climate Adaptation in the Water Sector: How can Research Best Meet the Needs of Decision Makers?	
Location	Panama City, Republic of Panama
Dates	December 2-4, 2013
Host Partner	Water Center for the Humid Tropics of Latin America and the Caribbean (CATHALAC)
Description	Synthesis of CCW's portfolio of Fast-Start funded projects in Latin America and the Caribbean (geographic focus).

Synthesis Meetings 2014

Resilient Cities Congress 2014	
Location	Bonn, Germany
Date	May 31 - June 2, 2013
Host Partner	Local Governments for Sustainability (ICLEI)
Description	Synthesis of CCW's urban and peri-urban portfolio (thematic focus).

Key Outputs	Summary of IDRC's participation

Communicating Research for Policy Influence: Climate Change and Water in Africa	
Location	Pretoria, South Africa
Dates	September 2014
Host Partner	WREN Communications
Description	Synthesis of CCW's portfolio of projects in Africa, with a focus on research communication for policy influence (regional focus).
Key Outputs	Synthesis briefs: • Strategies for adapting to water stress in the arid and semi-arid regions of Africa • Adaptation to climate change in African coastal cities • Improving access to climate-related information for adaptation

Synthesis Workshop on Climate and Hydrological Modelling	
Location	Cape Town, South Africa
Dates	October 2014 and September 2015
Host Partner	University of Cape Town
Description	Synthesis of CCW's portfolio of projects working on modelling (methodological focus).

Annex 8. Workshops and Conferences Supported by CCW

Workshops that aim to strengthen capacity of research partners

Project	Number of participants
106667 - AARC Inaugural Workshop	25 researchers
106980 - Workshop on Economic Analysis of Adaptation Options to Climate Change	31 researchers (at both English and French workshops)
107702 AfricaAdapt Reflection and Planning Workshop	7 researchers
107682 Integrated Climate Change Modelling and Policy Linkages for Adaptive Planning	40 researchers

Workshops that aimed to promote peer exchange and synthesis of knowledge

Project	Number of participants
106371 - Water, Climate Change and Natural Disasters : Impact and Prospects for the Bio-Bio Region in Chile	60 participants, including researchers, Chilean policy makers, and international experts
106395 – Workshop ICT Exploration: Innovative Application of ICTs in addressing Water-related Impacts of Climate Change	27 researchers from Asia, Africa, and Latin America and the Caribbean
106298 – Workshop Exploration Energy and Water Nexus: an Assessment of Services for Adaptation to Climate Change	18 researchers from Africa and Latin America and the Caribbean
106428 - Participant Support: Fifth Assessment Report of the Intergovernmental Panel on Climate Change	5 scientists were supported by IDRC.
107283 - Adapting to Uncertainty: Preliminary Findings on the Water-Related Impacts of Climate Change in Latin America and the Caribbean (Panama)	30 researchers and policy makers associated with Fast Start projects in LAC region, excluding IDRC staff.
107437 - Synthesis of Adaptation Research on Coastal and Delta Areas (Brazil)	20 researchers from 7 CCW supported projects, excluding IDRC staff.
107562 - Support for the UCCRN Initiating Workshop on Development of 2nd Assessment Report for Climate change	6 researchers were supported to participate in the workshop
106248 – Asia Synthesis Meeting: Adapting to Climate Change and Water Security in Asia	92 researchers associated with all CCW supported projects in Asia, excluding IDRC staff.

List of International and Regional Conferences supported by CCW

Conference	CCW project	Notes
Resilient Cities Forum 2014 Organized by ICLEI-Local Governments for Sustainability May 29-31, 2014. Bonn, Germany.	107703 Disseminating the Results of Urban Peri-Urban Climate Change Adaptation Research	12 CCW research partners attended
Resilient Cities Forum 2013. Organized by ICLEI-Local Governments for Sustainability May 31-June 2, 2013. Bonn, Germany.	107040 Dissemination and Synthesis of Urban/Peri-Urban Climate Change Adaptation Projects	10 CCW research partners attended
7th International Community-Based Adaptation Conference. Organized by the International Institute of Environment and Development. April 18-25, 2013. Dhaka, Bangladesh.	107276 Mainstreaming Community-Based Adaptation	7 CCW research partners from Africa, Asia and Latin America and Caribbean participated
Development & Climate Days – 10th Anniversary. Organized by Red Cross / Red Crescent Climate Centre. December 1-2, 2012. Doha, Qatar.	Supported the organization of Development & Climate Days as part of the activities around the UNFCCC COP18.	
First International Climate Change and Population Conference. Hosted by the Regional Institute for Population Studies. July 1-4, 2012. Accra, Ghana.		The Regional Institute for Population Studies at the University of Ghana is partner of IDRC's African Adaptation Research Centres initiative.
KLIMA 2012 Conference Hosted by the Hamburg University of Applied Sciences. November 5-9, 2012. Hamburg, Germany.		
14th World Water Congress. Organized by the International Water Resources Association. September 25-29, 2011. Pernambuco, Brazil.		CCW organized two sessions during and a pre-congress workshop at the congress. See program of CCW activities in the blog created for the event: CCW@IWRA.

Annex 9. Awards Recipients and Special Recognition

A number of CCW's project partners received awards or special recognition for their research. Below is an overview of the types of awards and/or recognition received, with links for additional information.

Award Recipient	Award/Recognition	IDRC Project
Pablo Imbach, Centro Agronómico Tropical de Investigación y Enseñanza (CATIE), Costa Rica	Dr. Imbach was recognized as one of Costa Rica's youngest outstanding scientists by Costa Rica's leading independent newspaper, El Financiero, for his contributions to climate change research.	107083 Adapting Community-Based Water Supply in Central America to a Changing Climate
Esteban Jobbagy, Consejo Nacional de Investigaciones Científicas y Técnicas, Argentina	The Konex Prize, which celebrates lifetime achievements by Argentinian personalities in a number of categories, was awarded to Dr. Jobaggy and recognised him as being one of the top 100 scientists in Argentina's history.	106601 Floods, Droughts and Farming on the Plains of Argentina and Paraguay: Adapting to climatic and hydrological changes in the Pampas & Chaco region
Lindiwe Sibanda, Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN), South Africa	The Yara Prize, which celebrates contributions to African agriculture, was awarded to Dr. Sibanda in recognition of her policy and advocacy work with FANRPAN.	106550 From Research to Policy: Linking climate change adaptation to sustainable agriculture in Southern Africa
Project team at University of the West Indies (PI: Adrian Cashman), Barbados	The project received the Research Team Award, offered by the University of West Indies.	107096 Sustainable Water Management under Climate Change in Small Island States of the Caribbean
Project team at Universidad Nacional de Colombia (PI: Sergio Orrego)	The project team received the highest level of recognition (A1) from Colciensias, the Colombian agency for science, technology, and innovation, in the category of "Forests and climate change" (see p.188, row COL0070134).	106924 Welfare Evaluation and the Economic Impacts of Climate Change on Water Supply in Chile, Colombia and Bolivia
Sebastian Vicuña, Pontificia Universidad Católica de Chile (PUCC)	The Chilean Minister of the Environment presented Dr. Vicuña with an award that recognizes his contributions for supporting environmental management in Chile.	107081 Vulnerability and Adaptation to Climate Variability and Change in the Maipo Basin, Central Chile
Daniel Conde, Universidad de la República, Uruguay	Dr. Conde was appointed by Uruguay Ministry of Environment as the National	106923 Risk Perception and Vulnerability of Wetlands Areas

	Coordinator for the Ramsar Convention's Scientific and Technical Review Panel	in South American Atlantic Coasts
Project team at Universidad de la República (PI: Daniel Conde), Uruguay	The Centro Interdisciplinario para el Manejo Costero Integrado del Cono Sur, led by Dr. Conde, has been granted the UNESCO Chair.	106923 Risk Perception and Vulnerability of Wetlands Areas in South American Atlantic Coasts
Reben Tete Larbi, PhD student affiliated with the project who is studying at the Regional Institute for Population Studies (RIPS) at the University of Ghana.	Mr. Labi won a Fox International Fellowship (2014-15), and will be formally recognized as a Visiting International Exchange Student at Yale University's Whitney and Betty MacMillan Center for International and Area Studies.	106548 Climate Change Adaptation Research and Capacity Development in Ghana
Vishal Narain, Management Development Institute, India, **M. Shah Alam Khan**, Bangladesh University of Engineering and Technology, **Rajesh Sada**, Nepal Engineering College, **Sreoshi Singh & Anjal Prakash** South Asian Consortium for Inter-Disciplinary Water Resources Studies, India (PI: Anjal Prakash)	The paper *Urbanization, peri-urban water (in)security and human well-being: a perspective from four South Asian cities*, (2013, Water International 38:7, pp 930-940). The paper was shortlisted by the editor-in-chief for the journal's Best Paper Award.	106248 Water Security in Peri-Urban South Asia: Adapting to Climate Change and Urbanisation.

Annex 10. Notable Grantee Contributions to Policy Reports

5th Assessment Report (AR5) of the Inter-governmental Panel on Climate Change (IPCC)

Last Name	First Name	Affiliation	Chapter
Khattabi	Abdellatif	104329 - Enabling Stakeholders in Moroccan Coastal Management to Develop Sustainable Climate Change Adaptation Policies and Plans (CCAA project)	WG2 5 - Coastal systems and low-lying areas
Roberts	Debra	104695 - Advancing Capacity to Support Climate Change Adaptation : Five Pilot Projects (CCAA project)	WG2 8 - Urban areas
Mitchell	Tom	104951 - AfricaAdapt: Knowledge Sharing for Climate Change Adaptation in Africa (CCAA project, with 106058 (Phase 2) and Reflection and Planning workshop (107702) funded under CCW)	WG2 13 - Livelihoods and poverty
Nkem	Johnson Ndi	104835 - Altering the climate of poverty under climate change: the forests of Congo Basin (CCAA project)	WG2 15 - Adaptation planning and implementation
Elshinnawy	Ibrahim	105515 - Adaptation to the impacts of sea level rise in the Nile Delta coastal zone, Egypt (CCAA project, precursor to 106551 funded under CCW)	WG2 15 - Adaptation planning and implementation
Abdrabo	Mohamed	105515 - Adaptation to the impacts of sea level rise in the Nile Delta coastal zone, Egypt (CCAA project, precursor to 106551 funded under CCW)	WG2 22 - Africa
Stone	John	Visiting Fellow working with CCAA program	WG2 28 - Polar regions
Driouech	Fatima	104329 - Enabling Stakeholders in Moroccan Coastal Management to Develop Sustainable Climate Change Adaptation Policies and Plans (CCAA project)	WG1 9 - Evaluation of Climate Models
Abiodun	Babatunde	104391 (phase 1) and 106391 (Phase 2) - African Climate Change Fellowship Program (CCAA project, with 107334 (Phase 3) funded under CCW)	WG1 9 - Evaluation of Climate Models
Dasgupta	Purnamita	106248 - Water Security in Periurban South Asia : Adapting to Climate Change and Urbanization	WG2 9 - Rural areas
Huq	Saleemul	106171 - Economics of Climate Change Adaptation (Advisory Committee member)	WG2 14 - Adaptation needs and options
Markandiya	Anil	106171 - Economics of Climate Change Adaptation (Advisory Committee member)	WG2 17 - Economics of adaptation
Chumbuwera	Muyeye	106171 - Economics of Climate Change Adaptation (Advisory Committee member)	WG2 17 - Economics of

			adaptation
Girardin	Osvaldo	107097 - Adaptation to Water Stress in the Comahue Region of Argentina	WG2 27 - Central and South America
Vicuna	Sebastian	107081 - Vulnerability and Adaptation to Climate Variability and Change in the Maipo Basin, Central Chile	WG2 27 - Central and South America
Meza	Francisco	107081 - Vulnerability and Adaptation to Climate Variability and Change in the Maipo Basin, Central Chile	WG2 9 - Rural areas
Hewitson	Bruce	107682 - Integrated Climate Change Modelling and Policy Linkages for Adaptive Planning	WG2 21 - Regional context
Nurse	Leonard	107096 - Sustainable Water Management under Climate Change in Small Island States of the Caribbean	WG2 29 - Small Islands
Chadee	Dave	107096 - Sustainable Water Management under Climate Change in Small Island States of the Caribbean (Steering Committee Leader for Work Package 5)	WG2 11 - Human Health: impacts, adaptation, and co-benefits
Agard	John	107096 - Sustainable Water Management under Climate Change in Small Island States of the Caribbean (Steering Committee Leader for Work Package 4)	WG2 29 - Small Islands
Mutabazzi	Kamaldin	106552 - Enhancing Climate Change Adaptation in Agriculture and Water Resources in the Greater Horn of Africa	Review editor Ch 5 - Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation
Takahashi	Ken	106714 - Climate Variability and Climate Change on the Mangrove Ecosystem in Tumbes, Peru	External reviewer
Espinoza	Jhan Carlo	106714 - Climate Variability and Climate Change on the Mangrove Ecosystem in Tumbes, Peru	External reviewer
Sumaya	Zakieldeen	106552 - Enhancing Climate Change Adaptation in Agriculture and Water Resources in the Greater Horn of Africa	WG2 13 - Livelihoods and poverty
Najam	Adil	106857 - Climate Change Adaptation, Water and Food Security in Pakistan	WG3 4 - Sustainable Development and Equity
Zinyengere	Nkulumo	106391 The African Climate Change Fellowship Programme - Phase II	Paper titled “Zinyengere, N., O. Crespo, and S. Hachigonta, 2013: Crop response to climate change in southern Africa: a comprehensive review. *Global and Planetary Change*,

			111, 118-126" cited in Africa chapter
Ndebele-Murisa	Mzime	106391 The African Climate Change Fellowship Programme - Phase II	Paper titled, "Ndebele-Murisa,M.R., E.Mashonjowa, andT.Hill, 2011:The implications of a changing climate on the Kapenta fish stocks of Lake Kariba, Zimbabwe. *Transactions of the Royal Society of South Africa*, 66(2), 105-119." cited in Africa chapter
Tumbo	Madaka	106391 The African Climate Change Fellowship Programme - Phase II	Paper titled "Hamisi, H.I., M. Tumbo, E. Kalumanga, and P. Yanda, 2012: Crisis in the wetlands: combined stresses in a changing climate – experience from Tanzania. *Climate and Development*, 4(1), 5-15." cited in Africa chapter

2nd Assessment Report on Climate Change and Cities (ARC3-2) of the Urban Climate Change Research Network (UCCRN)

Last Name	First Name	Affiliation	Chapter
Lwasa	Shuaib	106372-004 International Research Initiative on Adaptation to Climate Change (IRIACC) / Climate Change and the Health of Indigenous Communities*	4- Equity and Environmental Justice
Jitsuchon	Somchai	107094 - Improving Flood Management Planning in Thailand	4- Equity and Environmental Justice
Vicuña	Sebastián	107081 - Managing Water in the Rural-Urban Interface: the Key to Climate Change Resilient Cities	9- Urban Water, Wastewater, and Sanitation
Raschid-Sally	Liqa	105869 - Managing Water in the Rural-Urban Interface: the Key to Climate Change Resilient Cities	9- Urban Water, Wastewater, and Sanitation

Porio	Emma	106372-011 - International Research Initiative on Adaptation to Climate Change (IRIACC) / Coastal Cities at Risk*	12- Housing and Informal Settlements
Karki	Madhav	106487 - Building research capacity to understand and adapt to climate change in the Indus Basin	14- Urban Ecology, Biodiversity, and Ecosystem Services
Alam Khan	M Shah	106248 - Water Security in Periurban South Asia : Adapting to Climate Change and Urbanization	15- Coastal Zones
Ziervogel	Gina	105674 - Managing the Risk of Flooding and Sea-level Rise in Cape Town: the Power of Collective Governance	16- Governance and Policy

*Note: This is an IRIACC project and not a CCW project, although staff provide technical support to IRIACC projects.

Annex 11. List of research projects

Project number	Project title	Region and country	Lead partner	Lead partner site	Project website	Project abstract	Research outputs in the IDRC Digital Library
103710	ECOPOLIS Graduate Research and Design Competition			www.idrc.ca		103710	103710
103796	Focus Cities : Economic Incentives for Improving Water, Sanitation and Solid Waste Services in Jakarta (Indonesia)	Southeast Asia: Indonesia	Mercy Corps	www.mercycorps.org/		103796	103796
104150	Managing Climate Risk to Agriculture and Water Resources in South Africa	South Africa	University of the Free State	www.ufs.ac.za/		104150	104150
104347	Strengthening three Periurban Agricultural Producer Organizations in Latin America	Latin America & Caribbean Region: Argentina, Peru, Uruguay	IPES - Promotion of Sustainable Development	www.ipes.org/		104347	104347
104395	Focus City - Urban waste management in the city of Cochabamba, Bolivia	Latin America & Caribbean Region: Boliva	SGAB Conseil SRL - Sociedad de Gestión Ambiental Boliviana	www.sgab-bolivia.org/sgab.html	http://www.sgab-bolivia.org/cfcochabamba/	104395	104395
104396	Focus City: Rainwater and Greywater Harvesting in Urban and Peri-Urban Agriculture in Ariana-Soukra, Tunisia	MENA Region: Tunisia	Federation tunisienne des clubs UNESCO-ALESCO			104396	104396
104397	Focus City - Integrated & participatory research aimed at reducing vulnerability, poverty and environmental loads in Cercado de Lima, Peru	Latin America & Caribbean Region: Peru	Instituto de Desarrollo Urbano-CENCA	www.cenca.org.pe/		104397	104397
104554	Developing strategies for adaptation of rural communities to climate change in the Illimani watershed (Bolivian Andes)	Latin America & Caribbean Region: Bolivia	Universidad Mayor de San Andrés	www.umsa.bo/	http://glaciares.org.bo/illimani/ http://glaciares.org.bo/	104554	104554
104646	Autonomy and Community Management of Protected Areas in Neuquen and Araucania (Argentina and Chile)	Latin America & Caribbean Region: Argentina; Chile	Observatorio de Derechos de Pueblos Indigenas	www.observatorio.cl/pddii	http://www.observatorio.cl	104646	104646
104783	Land Use, Biofuels and Rural Development in the La Plata Basin (Latin America)	Latin America & Caribbean Region: Argentina, Bolivia, Brazil, Paraguay, Uruguay	Inter-American Institute for Global Change Research	www.iai.int/	http://www.iai.int/index.php?option=com_content&view=article&id=81&catid=53	104783	104783
104899	Participatory Improvement of Water and Sanitation Services in Tripoli through a Comparative Analysis with Irbid	MENA Region: Middle East	American University of Beirut	www.aub.edu.lb/		104899	104899
104908	Vers une collectivité productive à Malika (Sénégal) : une expérience d'aménagement participatif	West Africa: Senegal	Université Laval	https://www.ulaval.ca/		104908	104908
105183	Gender Dimension in Solid Waste Management in Urban and Periurban Areas (Latin America and the Caribbean)	Latin America & Caribbean Region: Bolivia, Brazil, Peru; Uruguay	Centro de Estudios y Promoción del Desarrollo [DESCO]	www.desco.org.pe/		105183	105183
105185	Assessing Multi-stakeholders partnerships in the Water and Sanitation Sector within the context of urban policies in LAC	Latin America & Caribbean Region	Building Partnerships for Development in Water and Sanitation	http://www.irc.nl/page/7150	http://www.bpd-waterandsanitation.org/web/w/www_186_en.aspx	105185	105185
105191	Prefabricated Engineered Bamboo Housing for East Africa	East & Southern Africa	International Network for Bamboo and Rattan	www.inbar.int/		105191	105191
105410	From Seed to Table : Strengthening Urban Farmers' Organizational and Marketing Skills (Middle East and North Africa)	MENA Region: Middle East	Stichting International Network of Resource Centres on Urban Agriculture and Food Security (RUAF)	www.ruaf.org/		105410	105410
105515	Adaptation to the Impacts of Sea Level Rise in the Nile Delta Coastal Zone	MENA Region: Egypt	National Water Research Centre	www.nwrc-egypt.org/		105515	105515
105524	Women's Rights and Access to Water and Sanitation in Asian Cities	South Asia: India	Femmes et villes international/Women in cities international/Mujeres y ciudades internacionales	www.femmesetvilles.org/	http://www.femmesetvilles.org/images/Publications/gender%20and%20essential%20services%20en.pdf http://www.femmesetvilles.org/index.php/en/our-work/projects http://www.femmesetvilles.org/images/Publications/handbook%20on%20wsas%20in%20low%20income%20neighbourhoods.pdf	105524	105524

105567	Enhancing resilience of rural communities to reduce impacts of droughts, floods and frost in the Mantaro Valley, Peru	Latin America & Caribbean Region: Peru	Instituto Geofísico del Perú	www.igp.gob.pe/		105567	105567
105673	Poverty and Environmental Vulnerability in Angola's Growing Slums	West Africa: Angola	Development Workshop - Angola	www.dw.angonet.org/		105673	105673
105674	Managing the Risk of Flooding and Sea-level Rise in Cape Town : the Power of Collective Governance	East & Southern Africa: South Africa (Cape Town)	University of Cape Town	www.uct.ac.za/		105674	105674
105707	Water and Sanitation: LAC cities adapting to climate change by making better use of their available bioenergy resources	Latin America & Caribbean Region: Brazil, Chile, Colombia, Honduras, Mexico	Universidad Nacional Autonoma de Mexico	www.unam.mx/	http://proyectos.iingen.unam.mx/LACClimateChange/EventosOrg.html	105707	105707
105719	Les Systemes d'information geographique participatifs (SIG-P) pour une gestion durable des ressources naturelles et la securite alimentaire en Afrique	Africa	Environmental Development Action in the Third World (ENDA-TM)	http://endatiersmonde.org/institi/index.php?lang=en	www.leadinafrica.org/	105719	105719
105721	Alternative Water Systems Project	South Asia: India	The India Institute of Technology, Madras	www.iitm.ac.in/		105721	105721
105813	The Carbon Market and Integrated Waste Solutions: A Case Study of Indonesia	Southeast Asia: Indonesia	Bremen Overseas Research and Development Association BORDA e.V.	www.borda-net.org/		105813	105813
105814	Climate Change and Human Health in Accra, Ghana	West Africa: Ghana	Regional Institute for Population Studies, University of Ghana	http://rips-ug.edu.gh/		105814	105814
105815	Protecting Cotonou's Urban Community in the Face of Climate Change	West Africa: Benin	Centre de Recherche et d'Expertise pour le Développement Local	www.credel.org/	http://www.credel.org/?-Projet-PCUG3C-	105815	105815
105836	Exploring Urban-Rural Interdependence and the Impacts of Climate Change in Tanzania and Malawi	East & Southern Africa: Tanzania; Malawi	Institute of Resource Assessment, University of Dar es Salaam	www.ira.udsm.ac.tz/		105836	105836
105838	CapaSIDS: Capacitty Building and Knowledge on Sustainable responses to Climate Change in small Islands States	West Africa: Cape Verde, Sao Tome and Principe	led by the Institute of Mechanical Engineering of the Instituto superior técnico, Lisbon, Portugal, in collaboration with NGOs Sol & Vento, Cape Verde and MARAPA (Mar Ambiente e Pesca Artesanal) in Sao Tome	www.idmec.ist.utl.pt/		105838	105838
105839	Implications of Climate Change on Rural-Urban Interactions: the Case Study of Aba and its Region, Southeastern Nigeria	West Africa: Nigeria	Nigeria Environmental Study Action Team	www.nestinteractive.org/		105839	105839
105868	Five-City Network to Pioneer Climate Change Adaptation in sub-Saharan Africa	East & Southern Africa: Cape Town (South Africa); Dar es Salaam (Tanzania); Maputo (Mozambique); Windhoek (Namibia); and Port St Louis (Mauritius)	International Council For Local Environmental Initiatives (ICLEI) - Section 21	http://www.sustainable.org/creating-community/inventories-and-indicators/149-international-council-for-local-environmental-initiatives-iclei	http://resilient-cities.iclei.org/fileadmin/sites/resilient-cities/files/Images_and_logos/Resilience_Resource_Point/ICLEI_Africa_5_City_Adaptation_Network_Workshop_Report_Final4_web_size.pdf	105868	105868
105869	Managing Water in the Rural-urban Interface in Ghana and Ethiopia: the Key to Climate Change Resilient Cities	East & Southern Africa: Ethiopia	International Water Management Institute	www.iwmi.cgiar.org	http://uradapt.iwmi.org/	105869	105869
105971	Synthèse des enseignements en matière d'adaptation aux changements climatiques, Composante 4: Guidance notes	Africa	IDRC	www.idrc.ca		105971	105971
106002	Strengthening the Role of Civil Society in Water Sector Governance Towards Climate Change Adaptation in African Cities - Durban, Maputo, Nairobi	East & Southern Africa: Kenya, South Africa, Mozambique	led by York University, Canada in collaboration with the Centre for Civil Society, University of KwaZulu-Natal, South Africa; IUCN Maputo, Mozambique; and University of Nairobi, and Kenyatta University, Kenya	www.yorku.ca/	http://ccaa.irisyorku.ca/research-project/	106002	106002
106034	Forest and Water Management for Mitigating the effects of Climate Change in the Middle Hills, Nepal	South Asia: Nepal	Institute for Social and Environmental Transition - Nepal	isetnepal.org.np/	http://isetnepal.org.np/projects/understanding-the-cross-scale-implications-of-forest-and-water-management-for-an-adaptation-and-mitigation-in-the-nepal-himalaya	106034	106034

106090	Workshop on Microbial Hazards of Fresh Plant Produce in Urban and Periurban Agriculture	Latin America & Caribbean Region: Argentina; Brazil; Mexico; Uruguay	Centro de Investigación y Estudios Avanzados del Instituto Politécnico Nacional	www.cinvestav.mx/		106090	106090
106136	French Version of Wastewater Irrigation and Health	Global	N/A			106136	106136
106171	Economics of Climate Change Adaptation	Global	International Institute for Environment and Development	http://www.iied.org/	http://www.iied.org/economics-climate-change-adaptation-water-sector	106171	106171
106243	Knowledge Sharing for Climate Change Adaptation in Africa 2010-12 and beyond	Africa	Environment and Development in the third world (ENDA-TM)	www.endatiersmonde.org/	http://www.africa-adapt.net/	106243	106243
106248	Water Security in Peri-Urban South Asia: Adapting to Climate Change and Urbanisation	South Asia: India, Bangladesh, Nepal	SACIWATERS	www.saciwaters.org/	http://www.saciwaters.org/periurban/	106248	106248
106291	Food Security and Climate Change in Cambodia	Southeast Asia: Cambodia	Community Based Natural Resource Management Learning Institute (CBNRM-LI)	http://www.cbnrmli.org	http://www.learninginstitute.org/index.php?page=project_ongoing_community	106291	106291
106298	Clean Energy and Water: An Assessment of Services for Adaptation to Climate Change	Global	N/A			106298	106298
106299	Programme de bourses Changements climatiques et eau : Adaptation H2O	Global	N/A			106299	106299
106316	Strengthening Environmental Economics Capacity in Research on Climate Change Adaptation	Latin America & Caribbean Region	Centro Agronomico Tropical de Investigacion y Ensenanza/Tropical Agriculture Research and Training Centre	catie.ac.cr/en/		106316	106316
106322	Dissemination of Research Results : Climate Change and Water Program Initiative	Global	N/A			106322	106322
106326	Building Capacity to Adapt to Climate Change in Southeast Asia	Southeast Asia: Philippines, Cambodia, Vietnam	College of Economics-Hue University	www.hueuni.edu.vn/portal/index.php/en/		106326	106326
106335	Migration and Natural Resource Management: Lessons Across the Globe	Global	Fundacion Programa Salvadoreno de Investigacion Sobre Desarollo y Medio Ambiente	www.prisma.org.sv	http://www.prisma.org.sv/index.php?id=28&tx_ttnews[tt_news]=462&cHash=0df9aa0c2685df23c47ae4ddfa5186d0	106335	106335
106344	Adaptation to Climate Change and Equity in Rural Colombia: The Role of Water Governance	Latin America & Caribbean Region: Colombia	Fundacion Evaristo Garcia Piedrahita	http://lfs-feg.sites.olt.ubc.ca/	http://www.landfood.ubc.ca/swc/projects/ACCCR/index.html	106344	106344
106371	Water, Climate Change and Natural Disasters: Impact and Prospects for the Bio-Bio Region, Chile	Latin America & Caribbean Region: Chile	Universidad de Concepción	https://www.udec.cl/		106371	106371
106391	Phase 2: African Climate Change Fellowship Program	Africa	Institute of Resource Assessment (IRA), University of Dar Es Salaam	www.ira.udsm.ac.tz/		106391	106391
106395	Innovative Application of ICTs in Addressing Water-Related Impacts of Climate Change	Global	Association for Progressive Communications (APC)	www.apc.org/	http://www.apc.org/es/system/files/ICTs_Climate_Change_Water.pdf	106395	106395
106418	Support for the XIVth IWRA World Water Congress - 2011	Global	International Water Resources Association, Inc.	www.iwra.org/		106418	106418
106428	Support for Developing Country Scientists to Participate in IPCC Assessment Report 5	Global	Carnegie Institute of Washington	www.ciw.edu		106428	106428
106487	Building research capacity to understand and adapt to climate change in the Indus Basin	South Asia: Pakistan	Institute for Social and Environmental Transition	www.i-s-e-t.org/	http://www.i-s-e-t.org/images/pdfs/technical%20report_26jul_13_v2.pdf	106487	106487
106533	Platform for Exchange between African Research Scientists and Policy-Makers on Climate Change Adaptation	Africa	Conseil ouest et centre africain pour la recherche et le developpement agricoles/West and Central African Council for Agricultural Research and Development	http://www.coraf.org/	http://www.coraf.org/database/projet/bailleurdetail.php?detail=NRM/08/CF/AUSAID/2011-14/	106533	106533
106547	Renforcement des connaissances économiques et de la capacité d'adaptation face aux changements climatiques au Bénin	West Africa: Benin	Initiatives pour un developpement integre durable	http://www.ididong.org/		106547	106547
106548	Climate Change Adaptation Research and Capacity Development in Ghana	West Africa: Ghana	Regional Institute for Population Studies	www.rips-ug.edu.gh/	http://rips-ccartcd.org/	106548	106548

106549	Irrigation et information climatique au Burkina Faso: de la recherche au renforcement des capacités institutionnelles et communautaires	West Africa: Burkina Faso	Institut International d'Ingenierie de l'Eau et de l'Environnement	www.2ie-edu.org/	http://www.idrc.ca/EN/Programs/Agriculture_and_the_Environment/Climate_Change_and_Water/Pages/NewsDetails.aspx?NewsID=441	106549	106549
106550	From Research to Policy : Linking climate change adaption to sustainable agriculture in Southern Africa	East & Southern Africa: Lesotho, Malawi, Swaziland	Food, Agriculture and Natural Resources Policy Analysis Network	www.fanrpan.org/		106550	106550
106551	Establishing the Alexandria Research Centre for Adaptation to Climate Change (ARCA)	MENA Region: Egypt	Alexandria University	www.alexu.edu.eg/	http://arca-eg.org/index.php	106551	106551
106552	Enhancing Climate Change Adaptation in Agriculture and Water Resources in the Greater Horn of Africa	East & Southern Africa: Tanzania; Ethiopia; Kenya; Sudan;	Sokoine University of Agriculture	www.suanet.ac.tz/		106552	106552
106591	Food and Livelihood Security in Punjab through Water, Energy and Agricultural Management	South Asia: India	Punjab Agricultural University	www.pau.edu/		106591	106591
106592	Climate Variability and Access to and Utilization of Water Resources in the Informal Settlements in Ouagadougou, Burkina Faso	West Africa: Burkina Faso	Université de Ouagadougou	http://www.univ-ouaga2.bf/	http://www.issp.bf/OPO/Recherches_Interventions/Variabilite-climatique/Variabilit%C3%A9-climatique3.html	106592	106592
106594	Using Information and Communication Technologies (ICTs) to Address Water Challenges in Uganda	East & Southern Africa: Uganda	Uganda Chartered Healthnet Makerere University	www.healthnet.or.ug/		106594	106594
106597	Impacts of Climate Variability in the Coastal Areas of Argentina and Uruguay at the Headwaters of the Rio de la Plata	Latin America & Caribbean Region: Argentina; Uruguay	Instituto de Medio Ambiente y Desarrollo America Latina (IIED AL) in Argentina and the Sociedad Amigos del Viento in Uruguay	http://www.iied-al.org.ar/home.html	http://www.iied-al.org.ar/riberas/home.html	106597	106597
106601	Floods, Droughts and Farming on the Plains of Argentina and Paraguay: Adapting to Climatic and Hydrological Changes in the Pampas and Chaco Regions	Latin America & Caribbean Region: Argentina, Paraguay	Consejo Nacional de Investigaciones Cientificas y Tecnicas	www.conicet.gov.ar/?lan=en	http://www.agrohidrollanuras.unsl.edu.ar/	106601	106601
106611	CCW Communications Activities and Support for Strategic Events	Global	N/A			106611	106611
106664	Agricultural Productivity and Climate Change in Arid and Semiarid Kenya	East & Southern Africa: Kenya	Kenya Agricultural Research Institute (KARI)	www.kari.org/	http://www.kari.org/kccu/idrc http://www.mcgill.ca/globalfoodsecurity/research-initiatives/kari	106664	106664
106669	A Technical Expert Network to support high quality scientific publications on climate change adaptation	Africa	International Institute for Environment and Development	www.iied.org/		106669	106669
106667	AARC Researchers Inaugural Workshop	Africa	University of Ghana	www.ug.edu.gh/	http://www.ug.edu.gh/rips/pub/1_Executive_Report-AARC_Projects_Inaugural_Workshop.pdf	106667	106667
106668	IWRA World Water Congress - Dissemination of Climate Change and Water Research Results	Global	N/A			106668	106668
106679	CCAA Book on Institutional Vulnerability - "Adapting" Institutions to Meet Climate Change Impacts in Africa	Africa	IDRC			106679	106679
106703	Strengthening livelihood security and adapting to climate uncertainty in Chilika Lagoon, India	South Asia: India	Wetlands International - South Asia Society (REGD)	www.wetlands.org/southasia		106703	106703
106706	Climate change and saltwater intrusion along the Eastern Mediterranean: Socio-economic vulnerability and adaptation	MENA Region: Lebanon	American University of Beirut	www.aub.edu.lb/		106706	106706
106707	Communicating climate change risks for adaptation in coastal and delta communities in Vietnam	Southeast Asia: Vietnam	NISTPASS	www.nistpass.gov.vn/en/		106707	106707
106711	Socio-Cultural Adaptations of Caboclos Communities to Extreme Tidal Events in the Amazon Estuary of Brazil	Latin America & Caribbean Region: Brazil	Universidade Federal do Pará	www.portal.ufpa.br/	www.proestuario.ufpa.br	106711	106711
106714	Impacts of Climate Variability and Climate Change on the Mangrove Ecosystem in Tumbes, Peru	Latin America & Caribbean Region: Peru	Instituto Geofísico del Perú	www.igp.gob.pe/		106714	106714
106823	Synthesizing the Outcomes of the Focus City Research Initiative	Global	Consultancy			106823	106823
106855	Application of ICTs for Water Management under Changing Climatic Conditions: Research Awards Program	Global	University of Nairobi	www.uonbi.ac.ke/	http://www.uonbi.ac.ke/projects/researchgrants/	106855	106855

106857-01	Climate Change, Water and Food Security in Pakistan: The Determinants, Impact and Cost Effectiveness of Climate Adaptation in the Indus Eco-region	South Asia: Pakistan	Lahore University of Management Sciences. Pakistan	www.lums.edu.pk/	http://lums.edu.pk/sse/content/dprc-projects	106857-01	106857-01
106857-02	Climate Change, Water and Food Security in Pakistan: Gender and Social Vulnerability to Climate Change: A study in Disaster Prone Areas in Sindh	South Asia: Pakistan	Social Policy and Development Centre Pakistan	www.spdc.org.pk/	http://www.spdc.org.pk/ClimateChangeProject.aspx	106857-02	106857-02
106857-03	Climate Change, Water and Food Security in Pakistan: Climate Change, Agriculture, and Food Security in Pakistan: Adaptation Option and Strategies	South Asia: Pakistan	Pakistan Institute of Development Economics	www.pide.org.pk/		106857-03	106857-03
106922	Securing Finance for Adaptation in Africa	Africa	Consultancy			106922	106922
106923	Risk Perception and Vulnerability of Wetlands Areas in South American Atlantic Coasts	Latin America & Caribbean Region REgion: Uruguay and Brazil	Universidad de la República (UdelaR-Uruguay)	www.fder.edu.uy/		106923	106923
106924	Welfare Evaluation and the Economic Impacts of Climate Change on Water Supply in Chile, Colombia and Bolivia	Latin America & Caribbean Region: Chile, Colombia and Bolivia	Universidad del Desarrollo	www.udd.cl/		106924	106924
106960	Gendered Adaptation to Climate-Induced Water Stress in Peri-Urban Southeast Asia	Southeast Asia	Gender and Development Studies	www.serd.ait.asia		106960	106960
106963	Water Governance, Desertification and Climate Change in the Araucania Region of Chile	Latin America & Caribbean Region: Chile	Centro de Educación y Tecnología para el Desarrollo del Sur – CET Sur Sede Punta de Parra.-	www.cetsur.org/	http://www.cetsur.cl/?p=680	106963	106963
106980	Workshop on Economic Analysis of Adaptation Options in Africa	Africa	University of Nairobi	www.uonbi.ac.ke/	http://www.efdinitiative.org/kenya/news/l/workshop-economic-analysis-adaptation-options-climate-change-africa/1512	106980	106980
106982	Proposal Review: Fast Start 2	LAC and Asia	N/A			106982	106982
107025	Water & Climate Change & Angola's Vulnerable Coastal Settlements	East & Southern Africa: Angola	Development Workshop Angola Rua rei Katyavala 113	http://www.dw.angonet.org/		107025	107025
107026	Inondations dans la banlieue de Dakar : Vers une adaptation par les ameliorations du bati, des infrastructures et de la gouvernance locale	West Africa: Senegal	Institut Africain de Gestion Urbaine (IAGU)	www.iagu.org/	http://www.iagu.org/inondation/index.html	107026	107026
107027	Enhanced water access for bio-diversity conservation and community well-being on the Mahafaly Plateau, Madagascar	East & Southern Africa: Madagascar	WWF -World Wide Fund for Nature WWF Madagascar & West Indian Ocean Programme Office	http://www.wwf.mg		107027	107027
107028	The Water and Food Security Nexus: Challenges and Opportunities for Vulnerable Areas	Global	World Food Programme	www.wfp.org/		107028	107028
107040	Dissemination and Synthesis of Urban/Peri-Urban Cimate Change Adaptation Projects	Global	ICLEI – Local Governments for Sustainability e.V. Kaiser-Friedrich-Str. 7	http://www.iclei.org		107040	107040
107081	Vulnerability and Adaptation to Climate Variability and Change in the Maipo Basin, Central Chile	Latin America & Caribbean region: Chile	Pontificia Universidad Católica de Chile	http://www.uc.cl/	http://cambioglobal.uc.cl/index.php/en/idrc-descripcion.html	107081	107081
107083	Adapting Community-Based Water Supply in Central America to a Changing Climate	Latin America & Caribbean region: Costa Rica, Nicaragua Guatemala	Centro Agronómico Tropical de Investigación y Enseñanza (CATIE)	www.catie.ac.cr/en/		107083	107083
107084	Water Security and Climate Change in Central America and the Caribbean	Latin America & Caribbean region: Guatemala, Dominican Republic	Centro del Agua del Trópico Húmedo para América Latina y el Caribe (CATHALAC)	www.cathalac.org/	http://www.cathalac.org/en/news-room/cathalac-news/press-releases/1603-regional-climate-change-and-water-security-idrc-sponsored-project-begins	107084	107084
107085	Building Effective Water Governance in the Asian Highlands	South Asia: China, Pakistan, Nepal	Kunming Institute of Botany, Chinese Academy of Sciences	http://english.kib.cas.cn/	http://www.asianhighlands.org/	107085	107085
107086	Adapting to Climate Change in Urbanizing Watersheds	South Asia: India	Ashoka Trust for Research in Ecology and the Environment (ATREE)	www.atree.org/	http://www.atree.org/project-ACCUWa	107086	107086
107087	Inland Aquaculture and Adaptation to Climate Change in Northern Thailand	Southeast Asia: Thailand	Unit for Social and Environmental Research (USER), Chiang Mai University	www.sea-user.org/	http://www.aquadapt.org/?pg=294	107087	107087
107088	Improving Water Governance and Climate Change Adaptation in Cambodia	Southeast Asia: Cambodia	Cambodia Development Resource Institute (CDRI)	www.cdri.org.kh/		107088	107088
107093	Water Resources and Adaptation to Climate Change in Vulnerable North China Plain and Poyang Lake Region in China	South Asia: China	Center for Chinese Agricultural Policy, Chinese Academy of Sciences	http://en.ccap.org.cn/		107093	107093
107094	Improving Flood Management Planning in Thailand	South Asia: China	Thailand Development Research Institute (TDRI)	http://tdri.or.th/en/	http://tdri.or.th/tdri-insight/isranews20121129/	107094	107094

107096	Sustainable Water Management under Climate Change in Small Island States of the Caribbean	Latin America & Caribbean region: Barbados, Caribbean, Trinidad and Tobago, Jamaica	The University of the West Indies (UWI)	www.uwi.edu/		107096	107096
107097	Adapting to Water Stress in Comahue Region of Argentina	Latin America & Caribbean Region: Argentina	Fundación Bariloche	www.fundacionbariloche.org.ar/	http://www.fundacionbariloche.org.ar/medio_ambiente/medioambiente_novedades.php	107097	107097
107098	Strengthening Local Capacity for Adaptation to Climate Change in the Bolivian Altiplano	Latin America & Caribbean Region: Chile	Agua Sustentable (Centro de Apoyo a la Gestión Sustentable del Agua y del Medio Ambiente)	www.aguasustentable.org/	http://glaciares.org.bo/cuenca_mauri/	107098	107098
107276	Mainstreaming Community-Based Adaptation	Global	Bangladesh Centre for Advanced Studies	www.bcas.net/		107276	107276
107282	Strengthening Social and Ecological and Adaptive Capacity to Climate Change in the Orotoy watershed, Colombia	Latin America & Caribbean Region: Colombia	Instituto de Investigaci6n en Recursos Biol6gicos "Alexander Von Humboldt"	www.humboldt.org.co/		107282	107282
107283	Adapting to Uncertainty - Preliminary Findings on the Water Related Impacts of Climate Change in Latin America and the Caribbean	Latin America & Caribbean Region	El Centro del Agua del Tr6pico Humedo para America Latina y el Caribe	http://www.cathalac.org		107283	107283
107334	The African Climate Change Fellowship Program - Phase III	Africa	Institute of Resource Assessment	www.ira.udsm.ac.tz/		107334	107334
107351	Mobilizing Private Sector Finance for Adaptation in Sub-Saharan Africa, Latin America and the Caribbean	Africa, Latin America & Caribbean	International Center for Environmental Technology Transfer	www.icett.or.jp/english/		107351	107351
107437	Synthesis of Adaptation Research on Coastal and Delta Area	Global	IDRC			107437	107437
107464	Promoting Excellence in Adaptation Research and Communications	Global	IDRC			107464	107464
107539	Mobilizing the Private Sector for Adaptation Finance - Project Development	Africa	International Center for Environmental Technology Transfer	www.icett.or.jp/english/		107539	107539
107562	Support for Urban Climate Change Research Network Initiating Workshop on Development of 2nd Assessment Report for Climate Change	Global	The Trustees of Columbia University in the City of New York	http://secretary.columbia.edu/trustees-columbia-university		107562	107562
107593	Economic Analysis of Adaptation to Climate Change: Synthesis of Current and Past Research	Global	London School of Economics and Political Science	www.lse.ac.uk/		107593	107593
107599	Climate Change and Water Adaptation Options	Global				107599	107599
107682	Integrated Climate Change Modelling and Policy Linkages for Adaptive Planning	Global		http://www.csag.uct.ac.za/		107682	107682
107702	AfricaAdapt Reflection and Planning Workshop	Africa		www.endaenergie.org/		107702	107702
107703	Disseminating the Results of Urban Peri-Urban Climate Change Adaptation Research	Global		www.iclei.org/		107703	107703
107750	Sponsorship of the 15th World Water Congress of the International Water Resources Association	Global		www.iwra.org/		107750	107750

Annex 12. Bibliography of Peer-Reviewed Publications

	Project #	Title of Article	Year of Publication	Journal	Citation	Author	Link to Article (external)	Key Themes
1	**103710** ECOPOLIS Graduate Research And Design Competition (Global)	***Effect of irrigation water and processing on the microbial quality of lettuces produced and sold on markets in Dakar (Senegal)***	2010	***Irrigation and Drainage***	Irrig. and Drain. 60:4, (2010) 509-517	M.L. NDIAYE S. NIANG H.-R. PFEIFER R. PEDUZZI M. TONOLLA Y. DIENG	http://onlinelibrary.wiley.com/doi/10.1002/ird.590/abstract	Urban and peri-urban water and sanitation; Water and agriculture; Waste management; Health
2	**103710** ECOPOLIS Graduate Research And Design Competition (Global)	***Development of a decision-support system for rural eco- environmental management in Yongxin County, Jiangxi Province, China***	2010	***Environmental Modelling & Software***	Environmental Modelling & Software 25:1 (2010) 24–42	Guo H. Huang Wei Sun Xiang-hui Nie Xiao-sheng Qin Xiao-dong Zhang	http://www.sciencedirect.com/science/article/pii/S1364815209001819	Water and agriculture; Modeling and decision-support tools; Economics of climate change adaptation
3	**103710** ECOPOLIS Graduate Research And Design Competition (Global)	***Effect of irrigation water on the incidence of Salmonella spp. on lettuces produced by urban agriculture and sold on the markets in Dakar, Senegal***	2011	***African Journal of Microbiology Research***	African Journal of Microbiology Research 5:19 (2011) 2885-2890	M. L. Ndiaye Y. Dieng S. Niang H. R. Pfeifer M. Tonolla R. Peduzzi	https://archive-ouverte.unige.ch/unige:19319	Urban and peri-urban water and sanitation; Water and agriculture; Waste management; Health
4	**103710** ECOPOLIS Graduate Research And Design Competition (Global)	***Impacts de l'utilisation des eaux polluees en Agriculture urbaine sur la qualite de la nappe de Dakar (senegal)***	2010	***VertigO -- La revue en sciences de l'environnement***	VertigO – La revue en sciences de l'environnement 10:2 (2010)	M. L. Ndiaye H.-R. Pfeifer S. Niang Y. Dieng M. Tonolla R. Peduzzi6	http://vertigo.revues.org/9965?lang=en	Urban and peri-urban water and sanitation; Water and agriculture; Waste management; Health

5	**103710** ECOPOLIS Graduate Research And Design Competition (Global)	***Inexact de Novo programming for water resources systems planning***	2009	***European Journal of Operational Research***	European Journal of Operational Research 199:2 (2009) 531–541	Y.M. Zhang G.H. Huang X.D. Zhang	http://www.sciencedirect.com/science/article/pii/S0377221708010060	Water governance and management; Modeling and decision-support tools
6	**103710** ECOPOLIS Graduate Research And Design Competition (Global)	***Possibilistic Stochastic Water Management Model for Agricultural Nonpoint Source Pollution***	2011	***Journal of Water Resources Planning and Management***	Journal of Water Resources Planning and Management 137:1, (2011) 101-112	Xiaodong Zhang Guo H. Huang Xianghui Nie	http://ascelibrary.org/doi/abs/10.1061/(ASCE)WR.1943-5452.0000096	Water and agriculture; Modeling and decision-support tools; Economics of climate change adaptation
7	**103710** ECOPOLIS Graduate Research And Design Competition (Global)	***Robust stochastic fuzzy possibilistic programming for environmental decision making under uncertainty***	2009	***Science of the Total Environment***	Science of the Total Environment 408:2 (2009) 192-201	Xiaodong Zhang Guo H. Huang Xianghui Nie	http://www.sciencedirect.com/science/article/pii/S0048969709009139	Water and agriculture; Waste management; Modeling and decision-support tools
8	**103710** ECOPOLIS Graduate Research And Design Competition (Global)	***Optimal decision schemes for agricultural water quality management planning with imprecise objective***	2009	***Agricultural Water Management***	Agricultural Water Management 96:12 (2009) 1723-1731	Xiaodong Zhang Guo H. Huang Xianghui Nie	http://www.sciencedirect.com/science/article/pii/S0378377409002054	Water and agriculture; Water governance and management; Modeling and decision-support tools
9	**103710** ECOPOLIS Graduate Research And Design Competition (Global)	***Asbestos-Related Disease in Banlgadeshi Ship Breakers: A Pilot Study***	2011	***International Journal of Occupational and Environmental Health***	International Journal of Occupational and Environmental Health, 17:2 (2011) 144–153	Midori N. Courtice Paul A. Demers Tim K. Takaro Sverre Vedal	http://www.shipbreakingplatform.org/shipbrea_wp2011/wp-content/uploads/2013/02/Courtice-2011-Asbestos-related-disease-in-Bangladeshi-shipbreakers.pdf	Health; Solid waste management; Gender

10	**104783** Land Use, Biofuels and Rural Development in the La Plata Basin (Latin America)	***Changes in Hydrology and salinity accompanying a century of agricultural conversion in Argentina***	2011	***Ecological Applications***	Ecological Applications 21:7 (2011) 2367-79	DUSHMANTHA H.]AYAWICKREME CELINA s. SANTONI JOHN H. KIM ESTEBAN G. JOBBAGY ROBERT B. JACKSON	http://biology.duke.edu/jackson/ea2011a2.pdf	Water and agriculture; Water governance and management
11	**104783** Land Use, Biofuels and Rural Development in the La Plata Basin (Latin America)	***Water and nitrate exchange between cultivated ecosystems and groundwater in the Rolling Pampas***	2009	***Agriculture, Ecosystems & Environment***	Agriculture, Ecosystems and Environment 134:3-4 (2009) 277–286	Silvina I. Portela Adrian E. Andriulo Esteban G. Jobbagy Marýa C. Sasal	http://www.sciencedirect.com/science/article/pii/S0167880909002291	Water and agriculture; Water governance and management; Modeling and decision-support tools
12	**104783** Land Use, Biofuels and Rural Development in the La Plata Basin (Latin America)	***The South American Land Data Assimilation System (SALDAS) 5-Yr Retrospective Atmospheric Forcing Datasets***	2009	***Journal of Hydrometeorology***	Journal of Hydrometeorology 10:4 (2009) 999–1010.	LUIS GUSTAVO G. DE GONCALVES WILLIAM J. SHUTTLEWORTH DANIEL VILA ELIANE LARROZA MARCUS J. BOTTINO DIRCEU L. HERDIES JOSE A. ARAVEQUIA JOAO G. Z. DE MATTOS DAVID L. TOLL MATTHEW RODELL	http://www.citeulike.org/user/IAI/article/6807191	Modeling and decision-support tools
13	**104783** Land Use, Biofuels and Rural Development in the La Plata Basin (Latin America)	***Ecological and environmental footprint of 50 years of agricultural expansion in Argentina***	2010	***Global Change Biology***	Global Change Biology (2010) doi: 10.1111/j.1365-2486.2010.02293.x	ERNESTO F. VIGLIZZO FEDERICO C. FRANK LORENA V. CARREN ESTEBAN G. JOBBAGY HERNAN PEREYRA JONATHAN CLATT DANIEL PINCEN M. FLORENCIA RICARD	http://gea.unsl.edu.ar/pdfs/Viglizzo_et_al_2010_Ecol_Footprint_GCB.pdf	Water and agriculture; Energy; Modeling and decision-support tools

14	**104783** Land Use, Biofuels and Rural Development in the La Plata Basin (Latin America)	***Evaluating the Consistency of the 1982–1999 NDVI Trends in the Iberian Peninsula across Four Time- series Derived from the AVHRR Sensor: LTDR, GIMMS, FASIR, and PAL-II***	2010	***Sensors***	Sensors 10:2. (2010) 1291-1314	Domingo Alcaraz-Segura Elisa Liras Siham Tabik José Paruelo Javier Cabello	http://www.mdpi.com/1424-8220/10/2/1291	Water and agriculture; Energy; Modeling and decision-support tools
15	**104783** Land Use, Biofuels and Rural Development in the La Plata Basin (Latin America)	***Surface and groundwater dynamics in the sedimentary plains of the Western Pampas (Argentina)***	2011	***Ecohydrology***	Ecohydrology 4:3 (2011) 433–447,	R. Aragon E. G. Jobbagy E. F. Viglizzo	http://onlinelibrary.wiley.com/doi/10.1002/eco.149/abstract	Water and agriculture; Disaster risk reduction; Water governance and management; Modeling and decision-support tools
16	**104783** Land Use, Biofuels and Rural Development in the La Plata Basin (Latin America)	***Remote sensing estimates of supplementary water consumption by arid ecosystems of central Argentina***	2011	***Journal of Hydrology***	Journal of Hydrology 397:1–2 (2011) 10–22	Sergio Contreras Esteban G. Jobbágy Pablo E. Villagra Marcelo D. Nosetto Juan Puigdefábregas	http://www.sciencedirect.com/science/article/pii/S0022169410007109	Water and agriculture; Mountain areas; Modeling and decision-
17	**104783** Land Use, Biofuels and Rural Development in the La Plata Basin (Latin America)	***The dynamics of cultivation and floods in arable lands of Central Argentina***	2009	***Hydrology and Earth System Science***	Hydrol. Earth Syst. Sci., 13 (2009) 491–502	E. F. Viglizzo E. G. Jobbagy L. Carreno F. C. Frank R. Aragon L. De Oro V. Salvador	http://www.hydrol-earth-syst-sci.net/13/491/2009/hess-13-491-2009.html	Disaster risk reduction; Water and agriculture;

18	**104783** Land Use, Biofuels and Rural Development in the La Plata Basin (Latin America)	***Debating the greening vs. browning of the North American boreal forest: differences between satellite Datasets***	2010	***Global Change Biology***	Global Change Biology 16:2 (2010) 760–770	DOMINGO ALCARAZ-SEGURA EM I L I O CHUVIECOS HOWARD E. EPSTEIN ERIC S. KASISCHKE ALEXANDER TRISHCHENKO	http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2486.2009.01956.x/abstract	Modeling and decision-support tools; Vegetation and carbon dynamics
19	**104783** Land Use, Biofuels and Rural Development in the La Plata Basin (Latin America)	***Land use change patterns in the Rio de la Plata grasslands: The influence of phytogeographic and political boundaries***	2009	***Agriculture, Ecosystems & Environment***	Agriculture, Ecosystems and Environment 134:3-4 (2009) 287-292	Ernesto Vega German Baldi Esteban G. Jobbagy Jose´ Paruelo	http://www.sciencedirect.com/science/article/pii/S016788090900231X	Water and agriculture; Modeling and decision-support tools
20	**104783** Land Use, Biofuels and Rural Development in the La Plata Basin (Latin America)	***The hydrologic consequences of Land cover change in central Argentina***	2012	***Agriculture, Ecosystems & Environment***	Agriculture, Ecosystems and Environment, 154 (2012) 2–11	M.D. Nosetto E.G.Jobbágya A.B.Brizuela R.B.Jackson	http://www.sciencedirect.com/science/article/pii/S0167880911000090	Water and agriculture; Water governance and management;
21	**104783** Land Use, Biofuels and Rural Development in the La Plata Basin (Latin America)	***Water subsidies from mountains to deserts: their role in sustaining groundwater-fed oases in a sandy landscape***	2011	***Ecological Applications***	Ecological Applications, 21:3, (2011) 678–694	E. G. JOBBAGY M. D. NOSETTO P. E. VILLAGRA R. B. JACKSON	http://www.ncbi.nlm.nih.gov/pubmed/21639036	Water and agriculture; Mountain areas
22	**104783** Land Use, Biofuels and Rural Development in the La Plata Basin (Latin America)	***Reciprocal influence of crops and shallow ground water in sandy landscapes of the Inland Pampas***	2009	***Field Crops Research***	Field Crops Research 113:2 (2009) 138-148	M.D. Nosetto E.G. Jobbagy R.B. Jackson G.A. Sznaider	http://www.sciencedirect.com/science/article/pii/S0378429009001075	Water and agriculture; Water governance and management
23	**104783** Land Use, Biofuels and Rural Development in the La Plata Basin (Latin America)	***Brazilian Biodiesel Policy: Social and environmental considerations of sustainability***	2009	***Energy***	Energy 34: 5 (2009) 645–654	Catherine Aliana Gucciardi Garcez Joao Nildo de Souza Vianna	http://www.sciencedirect.com/science/article/pii/S0360544208003149	Water and agriculture; Energy

24	**104783** Land Use, Biofuels and Rural Development in the La Plata Basin (Latin America)	***Long-term Satellite NDVI Data Sets: Evaluating Their Ability to Detect Ecosystem Functional Changes in South America***	2008	***Sensors***	Sensors 8:9 (2008) 5397-5425	Germán Baldi Marcelo D. Nosetto Roxana Aragón Fernando Aversa José M. Paruelo Esteban G. Jobbágy	http://www.mdpi.com/1424-8220/8/9/5397	Knowledge sharing;
25	**104783** Land Use, Biofuels and Rural Development in the La Plata Basin (Latin America)	***Stream acidification and base cation losses with grassland afforestation***	2008	***Water Resources Research***	WATER RESOURCES RESEARCH, 44, (2008) W00A03, dx.doi.org/10.1029/2007WR006659.	Kathleen A. Farley Gervasio Pineiro Sheila M. Palmer Esteban G. Jobbagy Robert B. Jackson	http://biology.duke.edu/jackson/wrr08.pdf	Water and agriculture; Water governance and management
26	**104783** Land Use, Biofuels and Rural Development in the La Plata Basin (Latin America)	***Grazing effects on below ground C and N stocks along a network of cattle exclosures in temperate and subtropical grasslands of South America***	2009	***Global Biogeochemical Cycles***	GLOBAL BIOGEOCHEMICAL CYCLES, 23 (2009) GB2003, doi:10.1029/2007GB003168, 2009	Gervasio Pineiro Jose´ M. Paruelo Esteban G. Jobbagy Robert B. Jackson Martin Oesterheld	http://biology.duke.edu/jackson/gbc09.pdf	Water and agriculture
27	**104783** Land Use, Biofuels and Rural Development in the La Plata Basin (Latin America)	***Regional patterns and controls of ecosystem salinization with grassland afforestation along a rainfall gradient***	2008	***Global Biogeochemical Cycles***	GLOBAL BIOGEOCHEMICAL CYCLES, 22 (2008) GB2015, doi:10.1029/2007GB003000	M. D. Nosetto E. G. Jobbagy T. Toth R. B. Jackson	http://biology.duke.edu/jackson/gbc08.pdf	Water and agriculture
28	**104783** Land Use, Biofuels and Rural Development in the La Plata Basin (Latin America)	***Dinámicas energéticas e integración regional en el noroeste argentino y el sur boliviano***	2010	***Revista de Geografía Norte Grande***	Revista de Geografía Norte Grande, 45 (2010) 51-62	Silvina Cecilia Carrizo Didier Ramousse	http://www.geo.puc.cl/html/revista/PDF/RGNG_N45/art04.pdf	Energy
29	**104783** Land Use, Biofuels and Rural Development in the La Plata Basin (Latin America)	***Biocombustibles en Argentina, Brasil y Colombia [Biofuels in Argentina, Brazil and Colombia : advances and limitations]***	2009	***Geograficando***	Geograficando, 5:5 (2009) 63-82	Silvina Cecilia Carrizo Didier Ramousse Sébastien Velut	http://dialnet.unirioja.es/servlet/articulo?codigo=3848879	Water and agriculture; Energy

30	**104783** Land Use, Biofuels and Rural Development in the La Plata Basin (Latin America)	***El desafío ecohidrológico de las transiciones entre sistemas leñosos y herbáceos en la llanura Chaco-Pampeana [The ecohydrological challenge of woody-herbaceous transitions in the Chaco-Pampas plains]***	2008	***Ecologia Austral***	Ecologia Austral, 18:3 (2008) 305-322	ESTEBAN G JOBBÁGY MARCELO D NOSETTO CELINA S SANTONI GERMÁN BALDI	http://www.scielo.org.ar/scielo.php?script=sci_arttext&pid=S1667-782X2008000300005	Water and agriculture; Water governance and management
31	**104783** Land Use, Biofuels and Rural Development in the La Plata Basin (Latin America)	***Cambios en el uso de la tierra en Argentina y Uruguay : marcos conceptuales para su análisis*** ***CONCEPTUAL FRAMEWORKS FOR THE ANALYSIS OF LAND USE CHANGES IN ARGENTINA AND URUGUAY***	2006	***Agrociencia***	Agrociencia. 10:2 (2006) 47 - 61	Paruelo, J.M. Guerschman, J.P. Piñeiro, G. Jobbágy, E.G. Verón, S.R. Baldi, G. Baeza, S.	http://www.fagro.edu.uy/~agrociencia/VOL10/2/pp47-61.pdf	Water and agriculture;
32	**104783** Land Use, Biofuels and Rural Development in the La Plata Basin (Latin America)	***Biocombustibles en Argentina, entre necesidades energéticas e intereses agroindustriales***	2008	***Revista Pampa***	Revista Pampa, 4:4. (2008), 1-16	Silvina Cecilia Carrizo	http://bibliotecavirtual.unl.edu.ar:8180/publicaciones/bitstream/11185/4491/1/Pampa_4_4_2008_pag_229_248.pdf	Water and agriculture; Energy
33	**104899** Improvement of Water and Sanitation Services: a Comparative Analysis of Tripoli (Lebanon) and Irbid (Jordan)	***Socio-Economics of water pollution as a development catalyst in poor urban slums***			Submitted for publication in the journal of Environment and Urbanization			

34	**105673** Poverty and Environmental Vulnerability in Angola's Growing Slums	***Combating Poverty and Environmental Vulnerability; Assessing the challenges in transforming Luanda's informal city***			Cities, accepted with revisions			
35	**105674** The Power of Collaborative Governance: Managing the Risks Associated with Flooding and Sea-level Rise in the City of Cape Town	***Using Multi-criteria Evaluation and GIS for Flood Risk Analysis in Informal Settlements of Cape Town: The Case of Graveyard Pond***	2012	***South African Journal of Geomatics***	South African Journal of Geomatics 1:1 (2012) 77-91	K. Musungu S. Motala J. Smit	http://www.sajg.org.za/index.php/sajg/article/view/27	Innundation; Urban and peri-urban water and sanitation; Housing; GIS
36	**105674** The Power of Collaborative Governance: Managing the Risks Associated with Flooding and Sea-level Rise in the City of Cape Town	***Drawing a line in the sand: managing coastal risks in the City of Cape Town***	2014	***South African Journal of Geomatics***	South African Journal of Geomatics Published Online 04 Jul 2014	D. Colenbrander A. Cartwright A. Taylor	http://www.tandfonline.com/doi/abs/10.1080/03736245.2014.924865	Innundation; Coastal vulnerability; Disaster risk reduction; Modelling and decision-support tools
37	**105674** The Power of Collaborative Governance: Managing the Risks Associated with Flooding and Sea-level Rise in the City of Cape Town	***Flooding in Cape Town's informal settlements: barriers to collaboraborative urban risk government***	2014	***South African Journal of Geomatics***	South African Journal of Geomatics Published Online 17 Jun 2014	G. Ziervogel J. Waddell W. Smit A. Taylor	http://www.tandfonline.com/doi/abs/10.1080/03736245.2014.924867	Coastal vulnerability; Disaster risk reduction; Modeling and decision-support tools
38	**105707** Adapting to Climate Change by making better use of Bioenergy Resources (Latin America and the Caribbean)	***Typology of Municipal Wastewater Treatment Technologies in Latin America***	2012	***Clean -- Soil, Air, Water***	Clean – Soil, Air, Water 40:9 (2012) 926–932	Adalberto Noyola Alejandro Padilla-Rivera Juan Manuel Morgan-Sagastume Leonor Patricia Gu¨ereca Flor Herna´ndez-Padilla	http://onlinelibrary.wiley.com/doi/10.1002/clen.201100707/abstract	Urban and peri-urban water and sanitation; Waste management

39	**105719** Les Systèmes d'information géographique participatifs (SIG-P) pour une gestion durable des ressources naturelles et la sécurité alimentaire en	***Modelling the hydrological balance of the Okpara catchment at the Kaboua outlet in Benin***	2013	***International Journal of AgriScience***	International Journal of AgriScience 3:3 (2013) 182-197,	Sintondji Luc O. Dossou-Yovo Elliott R. Agbossou Kossi E.	http://www.inacj.com/attachments/section/17/Temp%20March%202012-745_Sintondji%20Luc%20Ollivier%20C%20E%20C%20P%20(182-197).pdf	Water and agriculture; Water governance and management; Modeling and decision-support tools
40	**105721** Alternative Water Systems Project	***Efficacy of an appropriate point-of-use water treatment intervention for low-income communities in India utilizing Moringa oleifera, sari-cloth filtration and solar UV disinfection***	2011	***Journal of Water, Sanitation and Hygiene for Development***	Journal of Water, Sanitation and Hygiene for Development 1:2 (2011) 112–123	Syed Imran Ali Morgan MacDonald J. Jincy K. Arun Sampath G. Vinothini Ligy Philip Kevin Hall Kristan Aronson	http://blogs.washplus.org/drinkingwaterupdates/2011/12/efficacy-of-an-appropriate-point-of-use-water-treatment-intervention-for-low-income-communities-in-india-utilizing-moringa-oleifera/	Urban and peri-urban water and sanitation; Waste management; Health
41	**105721** Alternative Water Systems Project	***Alternatives for safe water provision in urban and peri- urban slums***	2010	***Journal of Water and Health***	J Water Health. 8:4 (2010) 720-34.	Syed Imran Ali	http://www.iwaponline.com/jwh/008/0720/0080720.pdf	Urban and peri-urban water and sanitation; Health; Modeling and decision-support tools
42	**105721** Alternative Water Systems Project	***Collaborative innovation for the development of contextually appropriate water treatment technology in a marginalized, low-income, South Asian community.***	2012	***International Journal of Technology Knowledge and Society***	International Journal of Technology, Knowledge and Society, 8:3 (2012) 195-110.	MacDonald, M. C. Philip, L. Ali, S. I. Srinivasan, S. Jincy, J. Sambath, A. K. Sagayaraj, I. R. Hall, K.	http://ijt.cgpublisher.com/product/pub.42/prod.862	Urban and peri-urban water and sanitation; Housing; Health

43	**105813** The Carbon Market and Integrated Waste Solutions: A Case Study of Indonesia	***Is carbon financing trashing integrated waste management? Experience from Indonesia***	2013	***Climate and Development***	Climate and Development, 5:4 (2013) 268–276	Carrie Mitchell Jati Kusumowatib	http://www.tandfonline.com/doi/full/10.1080/17565529.2013.836471#.U4OQlPldV8E	Solid waste management; Energy; Economics of climate change adaptation
44	**105814** Climate Change and Human Health in Accra, Ghana	***Perception, experience, and indigenous knowledge of climate change and variability: the case of Accra, a sub-Saharan African city***	2014	***Regional Environmental Change***	Regional Environmental Change 14:1 (2014) 369-383	Samuel Nii Ardey Codjoe George Owusu Virginia Burkett	http://link.springer.com/article/10.1007%2Fs10113-013-0500-0#page-1	Disaster risk reduction; Knowledge sharing
45	**105868** Sub-Saharan African Cities: A Five-City Network to Pioneer Climate Adaptation through Participatory Research and Local Action	***Participatory Action Adaptation: Tools for increasing climate change capacity and preparedness at the local government level***	2012	***Local Sustainability***	Local Sustainability Volume 2 (2012) 241-250	Priscilla Rowswell Lucinda Fairhurst Faith Chihumbiri	http://link.springer.com/chapter/10.1007%2F978-94-007-4223-9_26	Disaster risk reduction; Knowledge sharing; Building capacity
46	**106248** Water Security in Peri-Urban South Asia: Adapting to Climate Change and Urbanisation	***Groundwater Extraction: Implications on Local Water Security of Peri-urban Area of Kathmandu Valley***	2013	***Nepal Journal of Science and Technology***	Nepal Journal of Science and Technology 14:1 (2013) 121-128	Rajesh Sada Anushiya Shrestha Kanchan Karki Ashutosh Shukla	http://www.nepjol.info/index.php/NJST/article/view/8932	Urban and peri-urban water supply and sanitation; Water governance and management
47	**106248** Water Security in Peri-Urban South Asia: Adapting to Climate Change and Urbanisation	***Hydro-Meteorological Trends in Southwest Coastal Bangladesh: Perspectives of Climate Change and Human Interventions***	2013	***American Journal of Climate Change***	American Journal of Climate Change 2:1 (2013) 62-70	M. Shahjahan Mondal Mohammad Rashed Jalal M. Shah Alam Khan Uthpal Kumar Rezaur Rahman Hamidul Huq	http://www.scirp.org/journal/PaperInformation.aspx?paperID=29106#.U4OUefldV8E	Coastal vulnerability; Disaster risk reduction;

48	**106248** Water Security in Peri-Urban South Asia: Adapting to Climate Change and Urbanisation	***Whose land? Whose water? Water rights, equity and justice in a peri-urban context***	2014	***Local Environment: The International Journal of Justice and Sustainability***	Local Environment: The International Journal of Justice and Sustainability , 2014 DOI:10.1080/1354983 9.2014.907248	Vishal Narain	http://www.tandfonline.com/doi/abs/10.1080/13549839.2014.907248?journalCode=cloe20#.U4OWI_ldV8E	Urban and peri-urban water supply and sanitation; Water governance and management
49	**106298** Clean Energy and Water: An Assessment of Services for Adaptation to Climate Change	***Clean Energy and Water: Assessment of Mexico for Improved Water Services with Renewable Energy***	2013	***Environment, Development and Sustainability***	Environment, Development and Sustainability 15:5 (2013) 1303-1321	Kelly T. Sanders Carey W. King Ashlynn S. Stillwell Michael E. Webber	http://link.springer.com/article/10.1007%2Fs10668-013-9441-5	Energy; Water governance and management
50	**106299** Programme de bourses Changements climatiques et eau : Adaptation H2O	***Spatiotemporal analysis of the effects of forest covers on water yield in the Western Ghats of peninsular India***	2012	***Journal of Hydrology***	Journal of Hydrology 446-447 (2012) 24-34	Sunita Singh Arabinda Mishra	http://www.sciencedirect.com/science/article/pii/S0022216941200296X	Water and agriculture
51	**106299** Programme de bourses Changements climatiques et eau : Adaptation H2O	***Water and nitrate exchange between cultivated ecosystems and groundwater in the Rolling Pampas***	2009	***Agriculture, Ecosystems & Environment***	Agriculture, Ecosystems and Environment 134:3-4 (2009) 277-286	Silvina I. Portela Adrian E. Andriulo Esteban G. Jobbagy Maria C. Sasal	http://www.sciencedirect.com/science/article/pii/S0167880909002291	Water and agriculture
52	**106299** Programme de bourses Changements climatiques et eau : Adaptation H2O	***Deforestation-induced costs on the drinking water supplies of the mumbai metropolitain, India***	2014	***Global Environmnental Change***	Global Environmental Change 27(2014) 73-83	Sunita Singh Arabinda Mishra	http://www.sciencedirect.com/science/article/pii/S0959378014000867	Urban and peri-urban water supply and sanitation; Water governance and management
53	**106299** Programme de bourses Changements climatiques et eau : Adaptation H2O	***Fertilizer vs. organic matter contributions to nitrogen leaching in cropping systems of the Pampas: 15N application in field lysimeters***	2006	***Plant Soil***	Plant Soil 289:1-2 (2006) 265-277	Silvina I. Portela Adrian E. Andriulo Maria C. Sasal Bruno Mary Esteban G. Jobbagy	http://link.springer.com/article/10.1007%2Fs11104-006-9134-z	Water and agriculture

54	**106326** Building Capacity to Adapt to Climate Change in Southeast Asia	***Climate Change Impacts on Agriculture and Vulnerability as Expected Poverty of Kampong Speu Province, Cambodia***	2012	***International Journal of Environmental and Rural Development***	International Journal of Environmental and Rural Development 3-4 (2012) 28-37	NYDA CHHINH BUNNAK POCH	http://iserd.net/ijerd32/32028.pdf	Disaster risk reduction; Water and agriculture
55	**106326** Building Capacity to Adapt to Climate Change in Southeast Asia	***Assessing Marginalized Communities' Vulnerability To Climate Change In Thua Thien Hue***	2013	***Journal of Science***	Journal of Science, Hue University, 8:2 (2013) 209-219	Bui Duc Tinh and Bui Dung The	http://jos.hueuni.edu.vn/index.php/TCKHDHH/article/view/903	Vulnerability analysis
56	**106326** Building Capacity to Adapt to Climate Change in Southeast Asia	***Vulnerability to climate change as expected poverty: The case of Thua Thien Hue Province***	2013	***Journal of Science***	Journal of Science, Hue University, 80:2 (2013) 199-207	Dr. Bui Dung The Dr. Bui Duc Tinh	http://jos.hueuni.edu.vn/index.php/TCKHDHH/article/view/902	Vulnerability analysis
57	**106326** Building Capacity to Adapt to Climate Change in Southeast Asia	***Household's vulnerability to Climate change in Thua Thien Hue***	2012	***Journal of Science***	Journal of Science, Hue University, 70:1 (2012) 217-227	Dr. Bui Dung The Dr. Bui Duc Tinh		
58	**106344** Adaptation to Climate Change and Equity in Rural Colombia: The Role of Water Governance	***Water laws in the Andes: A promising precedent for challenging neoliberalism***	2013	***Geoforum***	Geoforum available online: 21 December, 2013 (In Press)	María Cecilia Roa-García Patricia Urteaga-Crovetto Rocío Bustamante-Zenteno	http://www.sciencedirect.com/science/article/pii/S001671851300256X	Water governance and management
59	**106344** Adaptation to Climate Change and Equity in Rural Colombia: The Role of Water Governance	***Recent Waves of Water Governance: Constitutional Reform and Resistance to Neoliberalization in Latin America (1990-2012)***	2013	***Geoforum***	Geoforum 50 (2013) 20–30	Leila M. Harris María Cecilia Roa Garcia	http://www.sciencedirect.com/science/article/pii/S0016718513001668	Water governance and management

60	**106344** Adaptation to Climate Change and Equity in Rural Colombia: The Role of Water Governance	***Equity, Efficiency and Sustainability in Water Allocation in the Andes: Trade-offs in a Full World***	2014	***Water Alternatives***	Water Alternatives 7:2 (2014) 298-319	M.C. Roa-García	http://www.water-alternatives.org/index.php/alldoc/articles/vol7/v7issue2/248-a7-2-2/file	Water governance and management
61	**106344** Adaptation to Climate Change and Equity in Rural Colombia: The Role of Water Governance	***Stream closure and water allocation in the Colombian Andes***	2014	***International Journal of Water***	International Journal of Water 8:2 (2014) 128-148	M.C Roa-García S. Brown L.M. Lavkulich	http://inderscience.metapress.com/content/a138736533706663/	Water governance, Water distribution, Rural water use
62	**106395** Innovative Application of ICTs in Addressing Water-related Impacts of Climate Change	***Appreciative inquiry: farmer participatory identification of opportunities and interventions to strengthen agri-food systems in Kenya***	2011	***African Crop Science Conference Proceedings***	African Crop Science Conference Proceedings 10 (2011) 349-353	M. MIRUKA I.MAINA J B. RONO P.N.M NJERU S. AMBOGA J. GITARI F. MURITHI	http://www.acss.ws/Upload/XML/Research/799.pdf	Water and agriculture; Capacity building
63	**106487** Building research capacity to understand and adapt to climate change in the Indus Basin	***A Simple Human Vulnerability Index to Climate Change Hazards for Pakistan***	2012	***International Journal of Disaster Risk Science***	International Journal of Disaster Risk Science 3:3 (2012) 163-176,	Fazal Ali Khan Ali Salman	http://link.springer.com/article/10.1007%2Fs13753-012-0017-z	Disaster risk reduction
64	**106487** Building research capacity to understand and adapt to climate change in the Indus Basin	***Adaptation vs. development: basic services for building resilience***	2014	***Development in Practice - Special Issue on climate change adaptation and development***	Development in Practice. Published Online 8 August 2014	F. Khan	http://www.tandfonline.com/doi/full/10.1080/09614524.2014.908823#.U_4lPPIdV8F	Disaster risk reduction; Climate change adaptation
65	**106548** Climate Change Adaptation Research and Capacity Development in Ghana	***Economic Analysis of Climate Variability Impact on Malaria Prevalence: The Case of Ghana***	2013	***Sustainability***	Sustainability 5:10 (2013) 4362-4378;	Wisdom Akpalu Samuel Nii Ardey Codjoe	http://www.mdpi.com/2071-1050/5/10/4362	Health

66	**106548** Climate Change Adaptation Research and Capacity Development in Ghana	***Climate Change and Cerebrospinal Meningitis in the Ghanaian Meningitis Belt***	2014	***International Journal of Environmental Research and Public Health***	International Journal of Environmental Research and Public Health 11 (2014) 6923-6939	S. N. A. Codjoe V. Adams Nabie	http://www.mdpi.com/1660-4601/11/7/6923	Health
67	**106548** Climate Change Adaptation Research and Capacity Development in Ghana	***Geophysical, socio-demographic characteristics and perception of flood vulnerability in Accra, Ghana***	2015	***Natural Hazards***	Natural Hazards (2015), published online	S. N. A. Codjoe S. Afuduo	http://link.springer.com/article/10.1007/s11069-015-1624-y	Flood vulnerability; perceptions of flood vulnerability
68	**106550** From Research to Policy: Linking climate change adaptation to sustainable agriculture in Southern Africa	***Consensus Between GCM Climate Change Projections with Empirical Downscaling: Precipitation Downscaling Over South Africa***	2006	***International Journal of Climatology***	Int. J. Climatol. 26: (2006) 1315–1337	B. C. HEWITSON R. G. CRANE	http://onlinelibrary.wiley.com/doi/10.1002/joc.1314/abstract	Water governance and management; Modeling and decision-support tools;
69	**106550** From Research to Policy: Linking climate change adaptation to sustainable agriculture in Southern Africa	***Factors Affecting Households Vulnerability to Climate Change in Swaziland: A Case of Mpolonjeni Area Development Programme (ADP)***	2013	***Journal of Agricultural Science***	Journal of Agricultural Science; 5:10 (2013) p 108	Majahodvwa S. Nkondze Micah B. Masuku Absalom Manyatsi	http://connection.ebscohost.com/c/articles/91677685/factors-affecting-households-vulnerability-climate-change-swaziland-case-mpolonjeni-area-development-programme-adp	Water and agriculture
70	**106550** From Research to Policy: Linking climate change adaptation to sustainable agriculture in Southern Africa	***P2 hierarchical decomposition procedure: application to irrigation strategies design***	2011	***Operational Research***	Operational Research 11:1 (2011) 19–39	Olivier Crespo J. E. Bergez F. Garcia	http://link.springer.com/article/10.1007%2Fs12351-009-0040-z	Water and agriculture
71	**106551** Establishing the Alexandria Research Centre for Adaptation to Climate Change (ARCA)	***Vulnerability of the Nile Delta coastal areas to inundation by sea level rise***	2012	***Environmental Monitoring and Assessment***	Environmental Monitoring and Assessment 185:8 (2013) 6607-6616	M. A. Hassaan M. A. Abdrabo	http://link.springer.com/article/10.1007%2Fs10661-012-3050-x	Coastal vulnerability; Disaster risk reduction;

72	**106551** Establishing the Alexandria Research Centre for Adaptation to Climate Change (ARCA)	***GIS-based risk assessment for the Nile Delta coastal zone under different sea level rise scenarios case study: Kafr EL Sheikh Governorate, Egypt***	2013	***Journal of Coastal Conservation***	Journal of Coastal Conservation 17:4 (2013) 743-754	M. A. Hassaan	http://link.springer.com/article/10.1007%2Fs11852-013-0273-0	Inundation, Sea level Rise, GIS
73	**106551** Establishing the Alexandria Research Centre for Adaptation to Climate Change (ARCA)	***Economic Impacts of SLR in Damietta Governerate, Nile Delta***	2014	***Journal of Environmental Protection***	Journal of Environmental Protection, 5:2 (2014) 87-95	M.A. Abdrabo M.A. Hassaan	http://www.scirp.org/journal/PaperInformation.aspx?PaperID=43218#.U4Oce_1dV8E	Coastal vulnerability; Disaster risk reduction; Water and agriculture; Economics of climate change adaptation; Modeling and decision-support tools
74	**106551** Establishing the Alexandria Research Centre for Adaptation to Climate Change (ARCA)	***Climate change and epidemiology of human parasitosis in Egypt: Review***	2013	***Journal of Advanced Research***	Journal of Advanced Research Published online June 2013 (In Press)	Wael M. Lotfy	http://www.sciencedirect.com/science/article/pii/S2090123213000088X	Health
75	**106592** Variabilités climatiques, conditions d'accès et d'utilisation des ressources en eau dans les quartiers informels à Ouagadougou, Burkina Faso	***ACCES A L'EAU POUR USAGE DOMESTIQUE DANS LES QUARTIERS INFORMELS DE OUAGADOUGOU : VARIATIONS SAISONNIERES ET REPONSES ADAPTATIVES***	2013	***Climat et Développement***	Climat et Développement N°15, Décembre 2013	SOURA ABDRAMANE DOS SANTOS STEPHANIE OUEDRAOGO FRANÇOIS DE CHARLES SANOU BAKARY YAKA PASCAL LANKOANDE BRUNO MILLOGO ROCH		Urban and peri-urban water and sanitation; Housing; Economics of climate change adapatation

76	**106592** Variabilités climatiques, conditions d'accès et d'utilisation des ressources en eau dans les quartiers informels à Ouagadougou, Burkina Faso	***Water related factors and childhood diarrhea in African informal settlements. A cross-sectional study in Ouagadougou (Burkina Faso)***	2014	***Journal of Water and Health***				Urban and peri-urban water and sanitation; Housing; Health
77	**106706** Climate change and saltwater intrusion along the Eastern Mediterranean: Socio-economic vulnerability and adaptation	***Public perception and economic implications of bottled water consumption in underprivileged urban areas***	2013	***Environmental Monitoring and Assessment***	Environ Monit Assess 185:4 (2013) 3093–3102	M. A. Massoud R. Maroun H. Abdelnabi I. I Jamali M. El-Fadel	http://link.springer.com/article/10.1007%2Fs10661-012-2775-x	Urban and peri-urban water and sanitation; Housing
78	**106706** Climate change and saltwater intrusion along the Eastern Mediterranean: Socio-economic vulnerability and adaptation	***Determinants of diarrhea prevalence in urban slums: a comparative assessment towards enhanced environmental management***	2014	***Environmental Monitoring and Assessment***	Environ Monit Assess 186:2 (2014) 665–677	M. El-Fadel R. Maroun R. Quba'a D. Mawla R. Sayess M. A. Massoud I. Jamali	http://link.springer.com/article/10.1007%2Fs10661-013-3406-x	Urban and peri-urban water and sanitation; Housing; Health

79	**106857** Climate Change Adaptation, Water and Food Security in Pakistan	***Using Climate Projections for Assessing Impacts at the City Scale***	2014	***Local Governments for Sustainability***	ICLEI – Local Governments for Sustainability - Africa, Cape Town, South Africa (2012) 18 pp. [Annex 51 from "Adaptation to Climate Change: Stakeholder engagement and understanding impacts - International Council for Local Environment Initiatives (ICLEI)" published in 2014]	M. Tadross; P. Johnston	http://r4d.dfid.gov.uk/Output/191641/	
80	**106924** Welfare Evaluation and the Economic Impacts of Climate Change on Water Supply in Chile, Colombia and Bolivia	***The economic impacts of climate change on the Chilean agricultural sector. A non-linear agricultural supply model***	2014	***Chilean Journal of Agrigcultural Research***	Chilean Journal of Agrigcultural Research 74(4) OCTOBER-DECEMBER 2014	Roberto Ponce Maria Blanco Carlo Giupponi		Water and agriculture; Modeling and decision-support tools; Economics of climate change adaptation
81	**107085** Building Effective Water Governance in the Asian Highlands	***Attribution of climate change, vegetation restoration, and engineering measures to the reduction of suspended sediment in the Kejie catchment, southwest China***	2014	***Hydrology and Earth System Science***	Hydrol. Earth Syst. Sci., 18, 1979–1994, 2014	X. Ma X. X. Lu M. van Noordwijk J. T. Li J. C. Xu	www.hydrol-earth-syst-sci.net/18/1979/2014/	Modeling and decision-support tools; Vulnerability analysis

82	**107085** Building Effective Water Governance in the Asian Highlands	***Environmental stratification to model climate change impacts on biodiversity and rubber production in Xishuangbanna, Yunnan, China***	2014	***Biological Conservation***	Biological Conservation 170 (2014) 264–273	Robert J. Zomer Antonio Trabucco Mingcheng Wang Rong Lang Huafang Chen Marc J. Metzger Alex Smajgl Philip Beckschäfer Jianchu Xu	http://www.sciencedirect.com/science/article/pii/S000632071300414X	Mountain areas; Modelling and decision-support tools; Vegetation and carbon dynamics
83	**107085** Building Effective Water Governance in the Asian Highlands	***Recalibrating China's environmental policy: The next 10 years***	2013	***Biological Conservation***	Biological Conservation 166 (2013) 287–292	R. Edward Grumbine Jianchu Xu	http://www.sciencedirect.com/science/article/pii/S0006320713002814	Water governance and management
84	**107085** Building Effective Water Governance in the Asian Highlands	***Integrating local hybrid knowledge and state support for climate change adaptation in the Asian Highlands***	2014	***Climatic Change***	Climatic Change May 2014, Volume 124, Issue 1-2, pp 93-104,	Jianchu Xu R. Edward Grumbine	http://link.springer.com/article/10.1007%2Fs10584-014-1090-7	Water governance and management; Mountain areas; Modeling and decision-
85	**107087** Inland Aquaculture and Adaptation to Climate Change in Northern Thailand	***Closing knowledge-action gaps in adaptation to climate change in the Asia-Pacific region***	2014	***International Journal of Environment and Sustainable Development***	Int. J. Environment and Sustainable Development, 13:2 (2014) 204-222	Louis Lebel	http://inderscience.metapress.com/content/d34hj25257w40423/	Water and agriculture; Knoweldge sharing
86	**107088** Improving Water Governance and Climate Change Adaptation in Cambodia	***A Triple Focus on Climate Change Vulnerability at Catchment and Commune Level***	2014	***Cambodia Development Review***	Cambodia Development Review 18:2 (2014) 12-17	K. Sour C. Phalla	http://www.cdri.org.kh/157-research/development-review/437-dev-t-review-vol-18,-issue-2.html	Water and agriculture; Climate change adaptation; Water distribution; Water governance and management

87	**107093** Water Resources and Adaptation to Climate Change in Vulnerable North China Plain and Poyang Lake Region in China	***Impacts of Climate Change on Water and Agricultural Production in Ten Large River Basins in China***	2013	***Journal of Integrative Agriculture***	Journal of Integrative Agriculture 12:7 (2013) 1267-1278	WANG Jin-xia HUANG Ji-kun YAN Ting-ting	http://www.sciencedirect.com/science/article/pii/S2095311913604219	Water and agriculture; Water governance and management; Modeling and decision-support tools
88	**107098** Strengthening local capacity for adaptation to climate change in the Bolivian Altiplano	***Climate Change and Water Resources in Arid Mountains: An Example from the Bolivian Andes***	2013	***AMBIO***	AMBIO 43:7 (2013) 852–863	Sally Rangecroft Stephan Harrison Karen Anderson John Magrath Ana Paola Castel Paula Pacheco	http://link.springer.com/article/10.1007%2Fs13280-013-0430-6	Mountain areas

89	**107098** Strengthening local capacity for adaptation to climate change in the Bolivian Altiplano	***Current state of glaciers in the tropical Andes: a multi-century perspective on glacier evolution and climate change***	2013	***The Cryosphere***	The Cryosphere, 7 (2013) 81–102	A. Rabatel B. Francou A. Soruco J. Gomez B. C´aceres J. L. Ceballos R. Basantes M. Vuille J.-E. Sicart C. Huggel M. Scheel Y. Lejeune Y. Arnaud M. Collet T. Condom G. Consoli V. Favier V. Jomelli R. Galarraga P. Ginot L. Maisincho J. Mendoza M. M´en´egoz E. Ramirez P. Ribstein W. Suarez M. Villacis P. Wagnon	http://www.the-cryosphere.net/7/81/2013/tc-7-81-2013.pdf	Mountain areas

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	Variacion espacial y temporal de las deposiciones atmosfericas en Argentina y Uruguay	2014	***Reunión Binacional Uruguay-Argentina de Agrometeorología y XV Reunión Argentina de Agrometeorología***	Reunión Binacional Uruguay-Argentina de Agrometeorología y XV Reunión Argentina de Agrometeorología, 1-3 octubre, Piriápolis, Uruguay	D.A. Carnelos C.L. Michel S. Portela E.G. Jobbágy R.B. Jackson C. Dibella D. Panario C. Fagúndez L.C. Grion L. Carreño G. Piñeiro		Water and agriculture
106299 Programme de bourses Changements climatiques et eau : Adaptation H2O	***Spatiotemporal analysis of the effects of forest covers on water yield in the Western Ghats of peninsular India***	2014	***Journal of Hydrology***	Journal of Hydrology 519 Part A (November 2014) 214-224	Sunita Singh Arabinda Mishra	http://www.sciencedirect.com/science/article/pii/S0022169414005265	Water and agriculture